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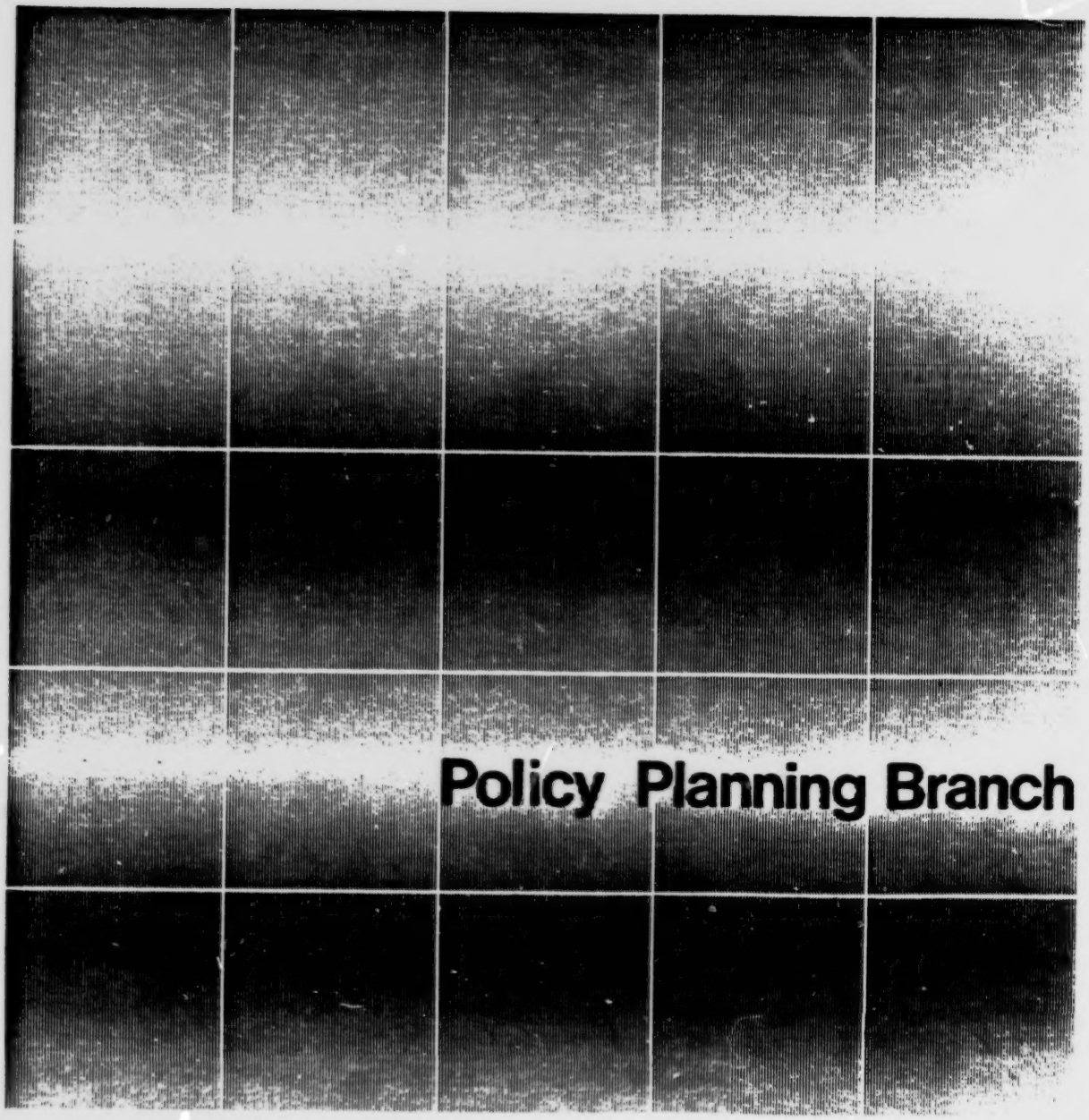

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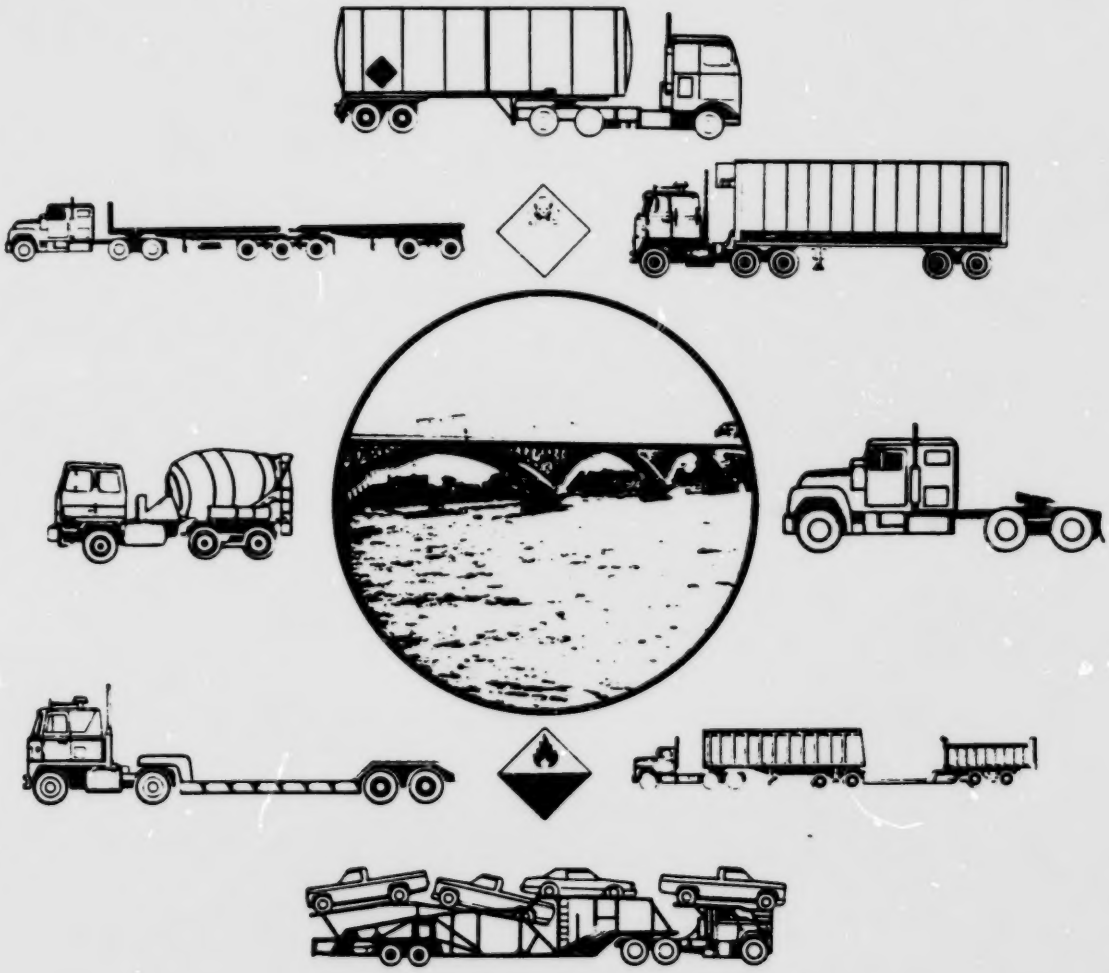
Ontario Commercial Vehicle Survey - 1983



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Ontario Commercial Vehicle Survey - 1983

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1.0 INTRODUCTION

1.1 BACKGROUND

The Ministry of Transportation and Communications(M T C) has periodically conducted roadside surveys of trucking and freight movements on Ontario highways, in order to collect information for planning and operational purposes. In 1971 a survey was conducted during the summer months while the implementation of Part III of the National Transportation Act was under consideration. In 1978 a similar survey was conducted prior to making reciprocal agreements with other jurisdictions. Both previous surveys were conducted by enforcement inspectors interviewing truck drivers at truck inspection stations.

The 1978 survey was conducted during the period of May to November of that year. This survey gave a profile of the highway movement of freight for that year. There were 37 inspection(weighscale) stations located on major highway corridors throughout Ontario. To capture a representative sample of truck traffic a random sampling method was used. Each station was given a list of 26 one hour time/day segments during which the survey was to be carried out. On average the number of hours of interviewing achieved per station was only 16 however. A total of 9,666 truck drivers were interviewed over a period of 26 weeks; the survey sample was expanded to 27,178 observations[1].

1.2 PRESENT PROBLEMS

In 1981, recognizing the need for regulatory reform in the trucking industry, the Government of Ontario set up a Committee of persons from industry and Government to review the trucking industry as a whole and the Ontario Public Commercial Vehicles(PCV) Act in particular. Outside consultants were retained to assemble and analyse what statistics were available on trucking and to review market trends. Comprehensive statistical profiles of the trucking industry in Ontario useful to the P C V Review Committee in gauging the nature, dimension and health of the regulated and non-regulated segments of the industry were not available. The previous Ministry of Transportation and Communications surveys provided some of the best sources of information about trucking, but they provided limited trend data. Information on changes in truck travel patterns and commodity movements on the highway system was not available. The Committee indicated that improved statistics would be useful in analysing future policy issues in trucking (such as interprovincial and international participation in the industry). They also indicated that statistics

and trend analyses would be essential to gauge the effects of regulatory reforms as implementation proceeded through 1984 and 1985.

In addition to the requirements identified by the P C V Review Committee, several other Offices within the M T C indicated a need for trucking statistics.

All these factors strongly indicated the need for another commercial vehicle survey along the same lines as the 1971 and 1978 surveys to satisfy the data needs of this Ministry and other jurisdictions.

1.3 SURVEY OBJECTIVES

The primary objective of the survey was to establish a profile of current trucking and trends, in order to provide information for the planning, delivery and evaluation of the Highway Planning and the Transportation Regulation Programs.

Beyond the above primary objective, this study was also specifically aimed at gathering data or information on:

- the nature and the extent of dangerous goods movement,
- the characteristics of border movements,
- the patterns of commodity movement,
- pavement loading.

1.4 SURVEY ORGANIZATION AND METHODOLOGY

With the facilities and resources available to M T C several data gathering methods were considered. Roadside studies are simpler than Corporate interviews or plant and terminal surveys. Both these latter types of surveys may be useful in analyzing industry health and distribution patterns and policies. On the other hand, roadside surveys are more revealing of vehicle and traffic patterns; and many inferences on industry and freight movement issues may be derived from traffic statistics. Moreover, by duplicating the type of surveys of 1971 and 1978, valuable trend information could be extracted, which would be unavailable otherwise. For these reasons, it was decided the best option was the repetition of the roadside survey format.

The overall co-ordination of the Commercial Vehicle Survey 1983 was carried out by the Transportation Demand Forecasting Office, Policy Planning Branch and the Program Administration Office,

Transportation Regulation Operations Division. Other Offices within the Ministry participated to varying degrees providing expertise in;

- questionnaire design,
- field work planning,
- liaison with inspection staff and outside agencies,
- report review.

The survey was carried out in the period April to August 1983. The Traffic Management and Engineering Office was responsible for the conduct and management of the field work. The survey was executed with the help of summer student interviewers and the Highway Carrier staff at the various locations. Regular operations at each inspection station were suspended for the duration of the survey (usually 24 hours).

The survey was conducted at 43 inspection stations, 8 international border crossings and 3 interprovincial border crossings. Permission to conduct the survey at some of the international border crossings was not granted by the bridge operating authorities. The location of the survey stations are depicted in Figures 1.1.1 and 1.1.2. A listing of the survey locations is given in Appendix A. The sample surveyed at each location and hours of survey is shown in Appendix B. Only eight of the fourteen international border crossings were surveyed. However, as the survey was also conducted at the truck inspection stations in the general vicinity of the border crossing points, it is believed that a substantial and representative portion of the international movement has been captured.

A copy of the Commercial Vehicle Survey Questionnaire used is given in Appendix C. A wide range of data was collected to satisfy the informational requirements of the Offices of the Ministry.

All trucks were routed through the weighing platforms. When an interviewer was ready to take a truck, the inspector would record the axle weights of the next truck entering the scales and hand the weigh slip to the interviewer. In the interim the interviewer would record the vehicle plate number and the order of weighing of the axles (i.e whether they were weighed singly or in tandem). The inspector would signal the trucker to park in the reserved area. The interviewer would approach the trucker, explain the purpose of the survey and request approval to interview. Truckers refusing to be interviewed were free to proceed. Fortunately, these were few and form an insignificant part(less than 1%) of the sample interviewed. After completion of the interview the bill of lading and other documents relating to the carriage of dangerous goods were photocopied. The interviews lasted between 8 and 12 minutes. At the international and inter-provincial border crossings axle weights were not recorded. However, all other required data was extracted from the truck operators and the documents carried by them.

Ten of the 19 Permanent Counting Stations were scheduled for 24 and 48 hour classification counts in 1983. The survey dates at

inspection stations close to the Permanent Counting Stations were scheduled to coincide with the classification counts. At other survey locations 24 hour classification counts were taken to expand the sample interviewed to the full 24 hour population.

1.5 DATA DESCRIPTION

It was planned that each inspection station would be surveyed for a 24 hour period, however some of the stations could not be surveyed for the full 24 hours (refer to Appendix B) due to,

- inclement weather,
- heavy traffic causing unsafe road conditions,
- malfunctioning of the signalling system,
- absence of proper lighting for safe operation.

As a result the average survey period per station was about 23.6 hours.

A total of 13,213 commercial vehicle drivers were interviewed over a period of 1296 hours at 54 survey locations. In the same period the number of trucks passing through these inspection stations was 65,803; hence, the overall sampling rate was 20.1%.

Trends and comparisons shown in this report have been derived from the earlier survey reports. The 1971 figures were extracted from "Part 111 - An Appraisal of the Potential Impact to Ontario from the Implementation of Part III of the National Transportation Act" by M.W.Menzies Group Ltd., (December 1972); and the 1978 figures from the Ontario Commercial Truck Survey, 1978, M.T.C., (March 1980).

1.6 DATA ADJUSTMENTS

Since the number of hours of survey for each station was required to be 24 hours, stations at which a few hours were lost due to factors beyond the control of the survey staff were adjusted by expanding the sample to the classification count for 24 hours. In the case of other stations where a substantial number of hours were missed the survey was restaged to cover the missing hours and the sample was expanded to the relevant classification count figures.

For some stations (11%) the survey was restricted to daylight hours only and here again the sample was expanded to an adjusted 24 hour classification count.

Corrections to account for the variation in traffic patterns at the different survey locations were required to convert the 24 hour expanded figures to an equivalent Average Annual Daily Traffic(truck

component). The 1982 AADT adjustment factors, truck movement trends at border crossings [2] and records from the Highway Carrier Office were used to estimate the truck AADT factors. The AADT factors relevant to the highway links on which the survey stations were located are quite stable (minimal change from year to year) due to the nature of the travel patterns. Further, it is generally accepted that the seasonal variation in truck traffic is less than that of automobile traffic.

In the case of survey stations located at international border crossings, truck volume data obtained from Statistics Canada was used to estimate AADT adjustment factors for the international border crossings.

Since some of the survey locations are along the same truck travel corridors a long distance trips is likely to pass through several survey locations and thus would bias the results. A correction to reduce this bias has been introduced into the records.

1.7 DATA RETRIEVAL FROM MASTER VEHICLE FILE

The following data pertaining to trucks registered in Ontario was extracted from the Master Vehicle File by reference to the licence plate number and copied onto each survey record;

(a) Body Type
(b) Model Year
(c) Registered Gross Vehicle Weight
(d) No. of Axles(on power unit only)

This additional data was accessed in order to establish the average age of the sample of Ontario trucks, the incidence of two and three axle tractor units and to supplement RGVW data where it was missing.

1.8 LIMITATIONS OF THE DATA

The prime limitation of the data relates to the fact that it was taken on only one day of the year. Hence, it provides no information about the daily, weekly, monthly or seasonal variations. It is possible that the commodities carried along certain corridors could be significantly different on a seasonal basis. For example more gravel trucks can be expected to use Highway 10 through survey station no. 224 at Victoria in the summer months.

The second limitation is that due to the location of the inspection stations only trucks travelling on major highways are

exposed to the survey. Fortunately, the inspection stations are located such that a high proportion of the intercity truck traffic is exposed to these stations.

Thirdly, only a small portion of the weekend traffic has been captured. As a result a bias towards the weekday traffic can be expected.

The fourth limitation occured at the international border crossings and some survey locations, were the actual axle weights were not recorded. This was in the interest of safety where weighing facilities could not be set up without disrupting traffic. At the same locations the waybills could not be photocopied due to the absence of a convenient power supply. The commodities carried and the commodity weights were extracted from the waybills or the information was solicited from the truck operator.

The fifth limitation is in connection with the border movement. Again, due to the location of the survey stations some trips between Ontario (notably Windsor and Sarnia) and the United States are not exposed to the survey. The figures for the border movements are likely to be underestimated as a result.

1.9 MISSING VALUES

Some of the cases in the data file do not have complete information for every variable. Statistical indicators recorded in this report have been generated without taking into consideration missing values. The minor variations in numbers seen in the tabulations are partly due to the missing values and rounding of decimal values.

1.10 SUPPLEMENTARY REPORT

Additional analysis material in the form of data tabulations will be incorporated in a supplementary report to be released at a later date.

1.11 MEANING OF TERMS

A glossary is provided in Appendix D to explain the meaning attached to certain terms used in the survey and in this report.

Figure 1.1.1 / Location of Survey Stations – Southern Ontario

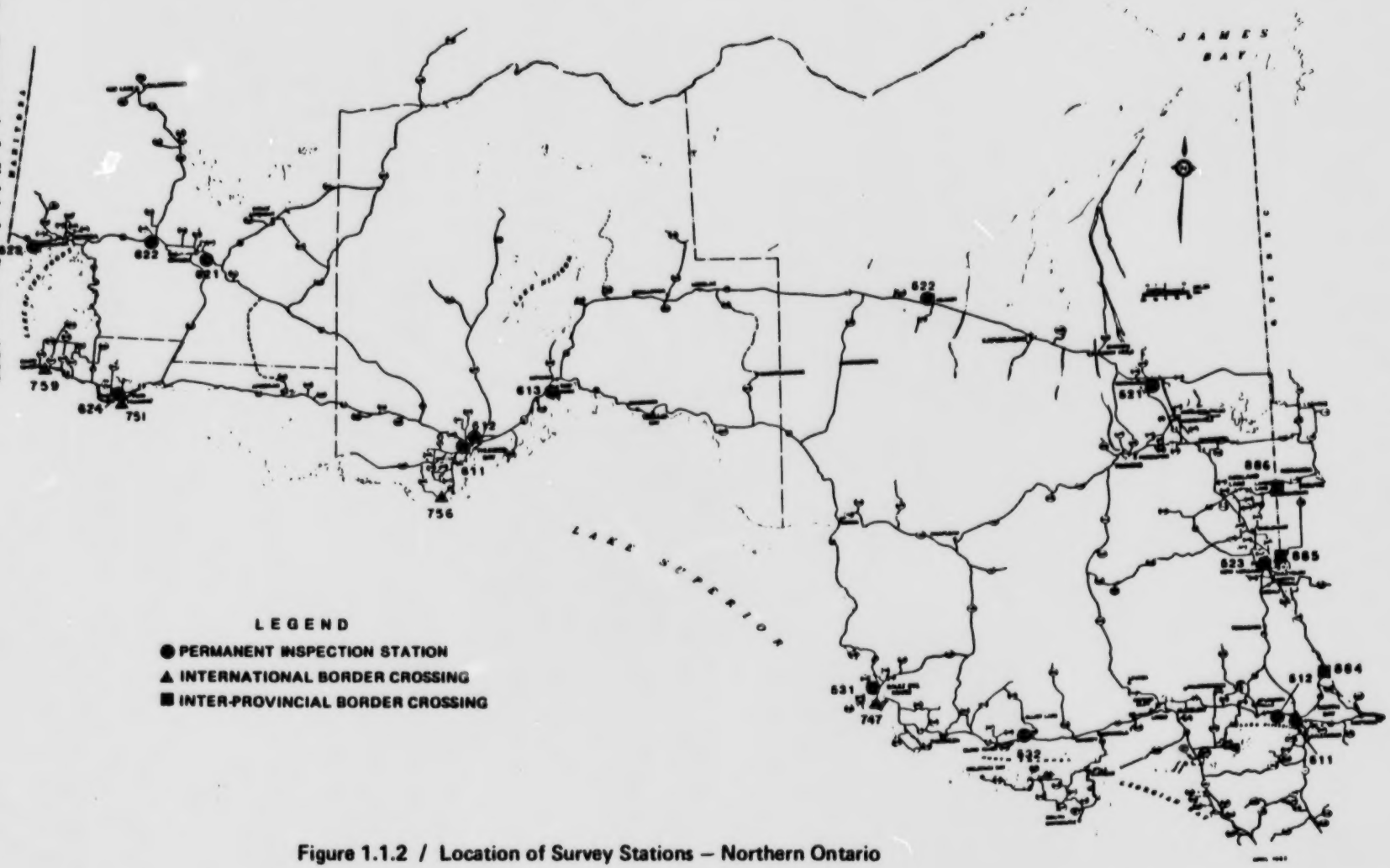


Figure 1.1.2 / Location of Survey Stations – Northern Ontario

2.0 PROFILE OF TRUCKING

This chapter provides a general profile of the trucking industry generated from the 1983 survey, as it impacts on the highway system. The analysis of the data has been broken down into seven major areas for ease of presentation: Vehicle, Carrier, Trip, Load, Commodity, Traffic and Driver.

2.1 VEHICLES

2.1.1 Truck Types

A schematic of truck types is shown in Figure 2.1.1. In this survey an attempt was made to generate a finer breakdown of truck types than the 1978 survey.

Table 2.1.1 shows the distribution of truck types in this survey as compared with those obtained in the 1971 and 1978 surveys.

The predominant type of truck is the tractor-trailer at 66.4% of the population. Straight trucks form about one-fifth of the population. Tractors with two trailers were found to be 4% in the proportion 55.45 between the B-train and the A-train type. The percentage of tractors with two trailers appear to have increased substantially when compared with the 1978 figures.

2.1.2 Body Types

Figure 2.1.2 depicts the truck body types and trailer types.

As can be seen from Table 2.1.2 vans predominate (56%). The percent of temperature controlled vans is comparatively small. Reference to vans in the rest of the report include temperature controlled vans unless specifically mentioned otherwise. The other frequently occuring identifiable body type were the flatbeds (11.7%) and tankers (9.0%).

In comparison with the 1978 survey results the percentage of trucks and tractors with van type body type(inclusive of temperature controlled vans) have increased. An increase of 35% in temperature

controlled trucks/tractors used mainly in the carriage of food items was noted.

A cross-tabulation of body types by truck type is shown in Table 2.1.3.

It indicates that over one-third (38.6%) of the trucks are tractor-trailers with van type body type and about one-seventh (14.1%) are straight trucks with van type body type. Tractor- trailer type flatbeds (8.8%) and tankers (6.8%) represent the two next highest categories of trucks.

2.1.3 Axles

The distribution of vehicles by number of axles is shown in Table 2.1.4. The five axle tractor-trailers appear to be the most numerous at about 49%, followed by two axle straight trucks (16.3%) and six axle tractor-trailers (8.4%).

From the distribution of trucks by number of axles for the two carrier types (See Table 2.1.5) it is noted that about two-thirds of the trucks operated by the for-hire carriers are the five axle type. The private carriers seem to have a larger share of the two, three and four axle trucks. In contrast the for-hire carriers have a larger share of the five and six axle trucks.

Analysis of data extracted from the Ontario Vehicle Registry System for those tractor units registered in Ontario shows the mix of tractors as 2 axle :19.1%, 3 axle :80% and 4 axle less than 1%.

2.1.4 Energy Saving Devices

Some trucks are equipped with wind deflectors and bubble type devices to reduce wind resistance to motion. They have been found to be energy efficient. Tests conducted in February 1980 in the United States (reference TRUCKSAVE information leaflet, Energy Ontario) indicate fuel savings of 10.8% have been achieved on trucks with roof mounted air deflectors. Generally the bubble devices are fitted on trailers and van type trucks. The deflectors are installed on the power/tractor units.

Figure 2.1.3 depicts the incidence of trucks installed with wind deflectors and/or bubble type devices.

It was observed that nearly 8.0% of the trucks were equipped with bubble devices and about 15% had air deflectors installed on the trucks. Less than 1% were equipped with both bubble devices and air deflectors. From the survey results it was evident that bubble devices are in use on other than van type trailers such, notably flatbeds, dump, stake, and even car-carriers.

2.1.5 Motive Power

The tabulation shown below give the distribution of trucks and tractors by motive power for the 1978 and 1983 surveys.

FUEL	1978 %	1983 %
Diesel	74	89.4
Gasoline	26	9.7
Propane/Natural Gas	-	0.9

When compared with the 1978 results the use of diesel fuel in inter-city truck travel appear to have increased significantly(20%). Propane and natural gas driven trucks are less than 1% of all trucks surveyed.

A cross-tabulation of the body types by motive power is shown in Table 2.1.6. Nearly 60% of the gasoline powered trucks and 55% of the diesel driven trucks were of the van type. Diesel powered flatbed trucks form the next significant group (10.8%) followed by tanker trucks (8.7%).

A cross-tabulation of truck types by motive power is shown in Table 2.1.7(a). Almost all(98%) combination trucks are diesel driven. Gasoline was used mostly (83%) for the operation of straight trucks by private carriers.

2.1.6 Registered Gross Vehicle Weight (R.G.V.W)

Table 2.1.8 shows a tabulation of R.G.V.W by R.G.V.W. classes.

Frequency distributions of registered gross vehicle weights for the industry segments gave the following statistics:

CARRIER	MEAN kg	MEDIAN kg	MODE kg	CASES #
For-hire	42,000	41,000	50,000	20,306
Private	33,300	36,400	36,400	24,780
Overall	37,200	38,000	50,000	45,086

The private carriers appear to be utilizing lighter vehicles than the for-hire carriers, obviously dictated by the demand patterns of each carrier type. The registered gross vehicle weight of half the trucks is less than 38,000 kg.

A cross-tabulation of registered gross vehicle weight (by weight classes) by industry segment is shown in Table 2.1.8. Trucks in the medium weight classes (35,001- 45,000 kgs) appear to be evenly split for both for-hire and private carriers. Above this transition point for-hire carriers appear to favour the heavier trucks.

2.1.7 Tare Weight

This refers to the empty weight of the truck/trailer unit. Difficulties were encountered with drivers not being in possesion of complete tare weight information. There were several cases of tare weights representing only the tractor. Estimates of tare weights were entered where sufficient information was available to do so.

Frequency distributions of tare weights for the industry segments gave the following statistics:

CARRIER	MEAN kg	MEDIAN kg	MODE kg	CASES #
For-hire	8,400	7,700	8,100	19,396
Private	7,600	7,400	7,500	23,855
Overall	8,000	7,600	7,500	43,251

This further supports the thesis that private carriers favour the lighter trucks and the for-hire carriers the heavier trucks. Monitoring this statistic would show the trend in the sizing of trucks.

2.1.8 Truck Leasing

Nearly 20.0% of trucks were reported as leased vehicles and another 5.8% of the drivers interviewed declared that they were not sure whether the vehicle was leased. The percentage of leased trucks in this survey is the same as that obtained in the 1978 survey(20%).

The duration of leasing is shown in Table 2.1.9. About 22% of the drivers who reported that the truck was rented/leased were either not sure or did not know the duration for which the vehicle had been leased. Five year terms (29.1%) appear to be the most popular lease arrangements. Short term leases or rental arrangements for periods of four weeks or less were under 10%. A significant percentage(12.6%) of the operators reported that the vehicles are on lease for indefinite periods(over 8 years).

A distribution of type of trucks leased by carrier type is shown in Table 2.1.10. It indicates that about three-quarters of all trucks leased are tractor-trailer combinations. Private carriers were seen as more likely to rent or lease trucks than the for-hire carriers.

2.1.9 Model Year

A distribution of the Ontario registered trucks by the year of registration is shown below. In the case of tractor units only the year of registration of the power unit is recorded.

Model Year	Frequency	Percentage
1983	1,125	2.9
1982	3,844	10.0
1981	5,125	13.3
1980	4,993	13.0
1979	5,993	15.4
1978	3,575	9.3
1977	2,649	6.9
1976	1,426	3.7
1975	1,446	3.8
1974	1,379	3.6
1973	958	2.5
1972	482	1.3
1971	235	0.6
1970 & Earlier	585	1.5
No Data	4,694	12.2
Total	38,447	100.0

About 10% of the Ontario registered trucks surveyed were over ten years old. The average age of trucks through all the survey locations taken together was 5.35 years.

2.1.10 Vehicle Registration

In the case of multiple registrations with Ontario those interviewing were requested to record the Ontario plate and not the other provinces or states in which the truck was also registered.

Table 2.1.11 shows the Province/State of registration of trucks.

In terms of vehicle registration, the 1983 data indicate a decrease in the share of the Ontario registered trucks from 90.2% in 1978 to 84.0% in this survey. Trucks registered in Quebec have shown an increase to 5.3% from 3.8%. It is noted that the largest number of U.S registered trucks using the Provincial Highway system were from New York (2%) and Michigan (1%) states.

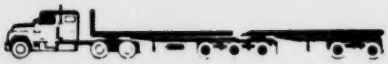
1. Straight Truck

2. Truck & Trailer

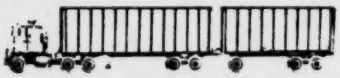
3. Tractor Only

4. Tractor & Trailer

5. Two Trailers - B Train



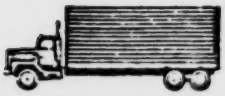
6. Two Trailers - Other



7.Other

Figure 2.1.1 / Schematic of Truck Types

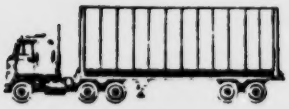
1 Van (no temperature control)



2 Temperature controlled

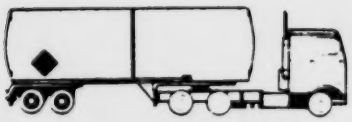
3 Concrete mixer

4 Stake truck



5 Dump truck

6 Tanker



7 Flat bed

8 Car carrier

9 Float

0 Other

Figure 2.1.2 / Schematic of Truck Body Types

TRUCK TYPE	1971 %	1978 %	1983 %
Straight Truck	23.9	29.5	22.8
Tractor only	0.3	0.5	1.3
Truck & Trailer	-	-	4.8
Tractor & Trailer	-	68.6	66.4
Two Trailers - B Train	75.8	1.4	2.0
Two Trailers - A-train	-		1.8
Other	-	-	0.9

Table 2.1.1 Distribution of Truck Types

BODY TYPES	1978 %	1983 %
Van(No temp. control)	46.7	47.9
Van(Temp. controlled)	6.3	8.5
Concrete Mixer	0.7	0.3
Stake	9.6	5.6
Dump	9.3	8.3
Tanker	7.8	9.0
Car Carrier	2.9	2.8
Flat Bed	13.8	11.7
Float	-	0.7
Other	2.9	5.3

(Based on the number of truck movements)

Table 2.1.2 Distribution of Trucks by Body Types

TRUCK TYPE

BODY TYPE	COUNT / ROW PCT / COL PCT / TOT PCT	1. STRAIGHT TRUCK	2. TRUCK & TRAILER	3. TRACTOR ONLY	4. TRACTOR &TRAILER	5. TRAILERS B TRAIN	6. TRAILERS A TRAIN	7. OTHER TYPES	ROW TOTAL
OTHER	0.	768	78	580	847	24	23	86	2406
		31.9	3.2	24.1	35.2	1.0	0.9	3.6	5.3
		7.3	3.6	100.0	2.8	2.6	2.7	20.9	
		1.7	0.2	1.3	1.9	0.1	0.0	0.2	
VAN	1.	5296	1050	0	15150	176	206	66	21945
		24.1	4.8	0.0	69.0	0.8	0.9	0.3	47.9
		50.7	48.3	0.0	49.8	19.3	24.7	16.1	
		11.6	2.3	0.0	33.1	0.4	0.5	0.1	
TEMP CONTROLLED	2.	1152	165	0	2502	23	27	13	3882
		29.7	4.3	0.0	64.5	0.6	0.7	0.3	8.5
		11.0	7.6	0.0	8.2	2.5	3.3	3.1	
		2.5	0.4	0.0	5.5	0.0	0.1	0.0	
CONCRETE MIX	3.	93	0	0	26	0	0	4	122
		75.8	0.0	0.0	21.3	0.0	0.0	2.9	0.3
		0.9	0.0	0.0	0.1	0.0	0.0	0.9	
		0.2	0.0	0.0	0.1	0.0	0.0	0.0	
STAKE	4.	839	55	0	1522	86	46	13	2560
		32.8	2.1	0.0	59.5	3.3	1.8	0.5	5.6
		8.0	2.5	0.0	5.0	9.4	5.5	3.3	
		1.8	0.1	0.0	3.3	0.2	0.1	0.0	
DUMP	5.	1218	175	0	1964	117	342	5	3820
		31.9	4.6	0.0	51.4	3.1	8.9	0.1	8.3
		11.6	8.0	0.0	6.5	12.8	41.0	1.1	
		2.7	0.4	0.0	4.3	0.3	0.7	0.0	
TANKER	6.	329	174	0	3114	247	116	134	4114
		8.0	4.2	0.0	75.7	6.0	2.8	3.3	9.0
		3.1	8.0	0.0	10.2	27.0	14.0	32.5	
		0.7	0.4	0.0	6.8	0.5	0.3	0.3	
FLAT BED	7.	732	261	0	4051	192	61	63	5358
		13.7	4.9	0.0	75.6	3.6	1.1	1.2	11.7
		7.0	12.0	0.0	13.3	20.9	7.3	15.2	
		1.6	0.6	0.0	8.8	0.4	0.1	0.1	
CAR CARRIER	8.	31	171	0	1033	36	3	11	1285
		2.4	13.3	0.0	80.4	2.8	0.2	0.8	2.8
		0.3	7.9	0.0	3.4	3.9	0.4	2.6	
		0.1	0.4	0.0	2.3	0.1	0.0	0.0	
FLOAT	9.	0	48	0	222	15	10	18	312
		0.0	15.3	0.0	70.9	4.7	3.3	5.8	0.7
		0.0	2.2	0.0	0.7	1.6	1.2	4.4	
		0.0	0.1	0.0	0.5	0.0	0.0	0.0	
	COLUMN	10456	2176	580	30430	915	834	412	45805
	TOTAL	22.8	4.8	1.3	66.4	2.0	1.8	0.9	100.0

Table 2.1.3 / Distribution of Body Type by Truck Type

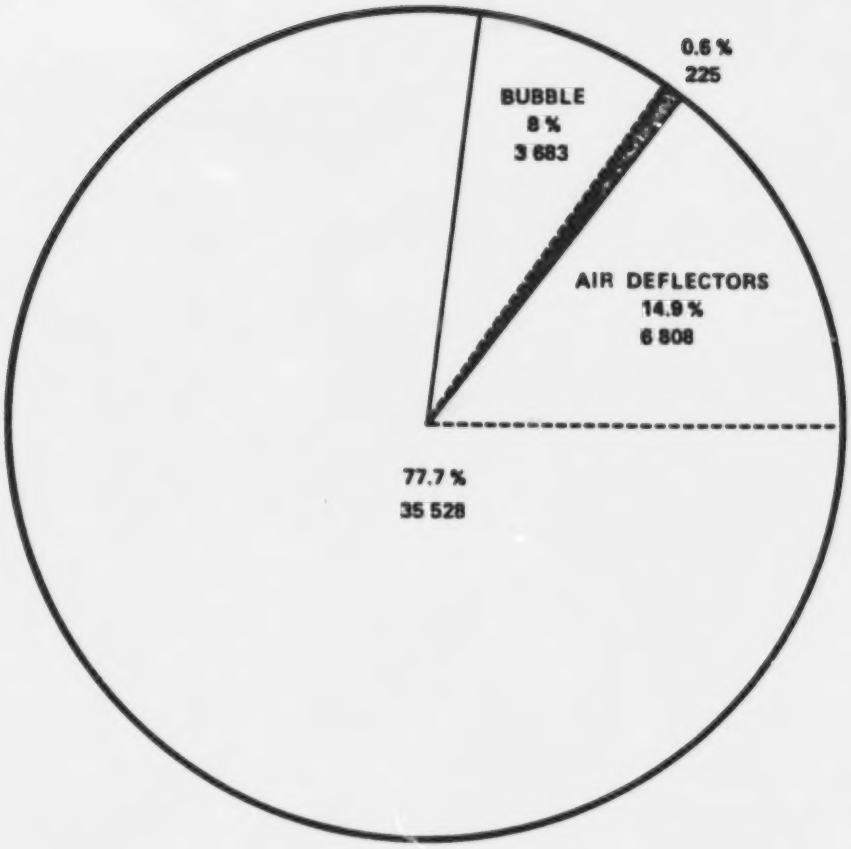
TRUCK TYPE	COUNT / ROW PCT / COL PCT / TOT PCT	No. OF AXLES 2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	ROW TOTAL
1. STRAIGHT TRUCK	COUNT	7451	2244	220	462	58	21	0	0	0	0	10456
	ROW PCT	71.3	21.5	2.1	4.4	0.6	0.2	0.0	0.0	0.0	0.0	22.8
	COL PCT	94.6	63.4	8.9	1.9	1.3	1.4	0.0	0.0	0.0	0.0	
	TOT PCT	16.3	4.9	0.5	1.0	0.1	0.0	0.0	0.0	0.0	0.0	
2. TRUCK & TRAILER	COUNT	136	118	158	1320	351	90	3	0	0	0	2176
	ROW PCT	6.2	5.4	7.3	60.7	16.1	4.1	0.2	0.0	0.0	0.0	4.8
	COL PCT	1.7	3.3	6.4	5.3	7.8	6.1	0.3	0.0	0.0	0.0	
	TOT PCT	0.3	0.3	0.3	2.9	0.8	0.2	0.0	0.0	0.0	0.0	
3. TRACTOR ONLY	COUNT	110	438	15	17	0	0	0	0	0	0	580
	ROW PCT	18.9	75.5	2.5	3.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3
	COL PCT	1.4	12.4	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	
	TOT PCT	0.2	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
4. TRACTOR &TRAILER	COUNT	142	706	2036	22458	3860	907	253	51	9	2	30427
	ROW PCT	0.5	2.3	6.7	73.8	12.7	3.0	0.8	0.2	0.0	0.0	66.4
	COL PCT	1.8	20.0	82.5	90.8	85.4	62.3	25.4	30.6	42.2	6.5	
	TOT PCT	0.3	1.5	4.4	49.0	8.4	2.0	0.6	0.1	0.0	0.0	
5. TRAILERS B TRAIN	COUNT	0	0	0	133	75	203	457	37	1	9	915
	ROW PCT	0.0	0.0	0.0	14.5	8.2	22.2	49.9	4.1	0.2	0.9	2.0
	COL PCT	0.0	0.0	0.0	0.5	1.7	14.0	45.9	22.4	7.0	26.6	
	TOT PCT	0.0	0.0	0.0	0.3	0.2	0.4	1.0	0.1	0.0	0.0	
6. TRAILERS A TRAIN	COUNT	0	0	29	114	113	220	261	72	4	21	834
	ROW PCT	0.0	0.0	3.4	13.7	13.5	26.4	31.3	8.6	0.5	2.6	1.8
	COL PCT	0.0	0.0	1.2	0.5	2.5	15.1	26.3	43.2	18.1	66.8	
	TOT PCT	0.0	0.0	0.1	0.2	0.2	0.5	0.6	0.2	0.0	0.0	
7. OTHER TYPES	COUNT	40	30	12	216	64	16	21	6	7	0	412
	ROW PCT	9.6	7.4	2.8	52.4	15.6	3.9	5.0	1.6	1.7	0.0	0.9
	COL PCT	0.5	0.9	0.5	0.9	1.4	1.1	2.1	3.9	32.7	0.0	
	TOT PCT	0.1	0.1	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.0	
COLUMN TOTAL		7878	3539	2469	24721	4521	1458	995	166	21	32	45800
		17.2	7.7	5.4	54.0	9.9	3.2	2.2	0.4	0.0	0.1	100.0

Table 2.1.4 / Distribution of Trucks by Type and No. of Axles

NO. OF AXLES

CARRIER TYPE	2	3	4	5	6	7	8	9>	TOTAL
	(- - - - # / % of Tot. / Col %- - - -)								Col %
For-hire	1162	1037	977	13490	2523	679	502	167	20536
	2.5	2.3	2.1	29.5	5.5	1.5	1.1	0.4	
	14.7	29.3	39.6	54.6	55.8	46.6	50.4	75.9	44.8
Private	6717	2503	1492	11231	1998	778	493	53	25265
	14.7	5.5	3.3	24.5	4.4	1.7	1.1	0.1	
	85.4	70.7	60.4	45.4	44.2	53.4	49.6	24.9	55.2
Total	7878	3539	2469	24721	4521	1458	995	219	45800
	17.2	7.7	5.4	54.0	9.9	3.2	2.2	0.5	100.0

Table 2.1.5 Distribution of Trucks by No. of Axles for each Carrier Type.



TOTAL 100 % = 45 794

Figure 2.1.3 / Usage of Air Deflectors and Bubble Type Devices

BODY TYPE	MOTIVE POWER				
	Gas	Diesel	Propane	Other	Total
	(- - - - - - # / % of Tot. - - - -)				
Van(no temp.control)	2,410	19,298	235	1	21,944
	5.3	42.1	0.5	0.0	47.9
Van(temp.controlled)	272	3,556	53	-	3,882
	0.6	7.8	0.1		8.5
Concrete Mixer	-	122	-	-	122
		0.3			0.3
Stake	465	2,046	49	-	2,560
	1.0	4.5	0.1		5.6
Dump	342	3,465	13	-	3,820
	0.7	7.6	0.0		8.3
Tanker	96	4,006	6	6	4,114
	0.2	8.7	0.0	0.0	9.0
Car Carrier	29	1,256	-	-	1,285
	0.1	2.7			2.8
Flat Bed	399	4,933	25	-	5,357
	0.9	10.8	0.1		11.7
Float	16	296	-	-	312
	0.0	0.6			0.7
Other	417	1,969	20	-	2,406
	0.9	4.3	0.0		5.3
Total	4,447	40,947	402	7	45,803
	9.7	89.4	0.9	0.0	100.0

Table 2.1.6 Distribution of Trucks by Body Types and Motive Power

TRUCK TYPE	MOTIVE POWER				
	Gas	Diesel	Propane	Other	Total
Straight Truck	3,706	6,393	356	1	10,456
	8.1	14.0	0.8	0.0	22.8
Tractor only	5	563	13	-	580
	0.0	1.2	0.0		1.3
Truck & Trailer	126	2,040	10	-	2,176
	0.3	4.5	0.0		4.8
Tractor & Trailer	571	29,827	18	6	30,422
	1.2	65.1	0.0	0.0	66.4
Two Trailers	8	908	-	-	915
(B-train)	0.0	2.0			2.0
Two Trailers	9	825	-	-	834
(A-train)	0.0	1.8			1.8
Other	22	384	5	-	412
	0.0	0.8	0.0		0.9
Total	4,447	40,940	402	7	45,796
	9.7	89.4	0.9	0.0	100.0

Table 2.1.7(a) Distribution of Truck Types by Motive Power

CARRIER TYPE	MOTIVE POWER				
	Gas	Diesel	Propane	Other	Total
For -hire	729	19,742	62	-	20,533
	1.6	43.1	0.1		44.8
Private	3,718	21,195	340	7	25,262
	8.1	46.3	0.7	0.0	55.2
Total	4,447	40,938	402	7	45,794
	9.7	89.4	0.9	0.0	100.0

Table 2.1.7(b) Distribution by Carrier Type and Motive Power

R.G.V.W (kg.)	CARRIER TYPE For-hire	Private	Total
0 - 2400	237	535	772
	0.5	1.2	1.7
2401- 5000	130	1,006	1,136
	0.3	2.2	2.5
5001-10000	275	1,445	1,720
	0.6	3.2	3.8
10001-15000	806	3,513	4,319
	1.8	7.7	9.5
15001-20000	328	1,081	1,410
	0.7	2.4	3.1
20001-25000	795	1,673	2,468
	1.7	3.7	5.4
25001-30000	892	1,831	2,723
	1.9	4.0	5.9
30001-35000	1,759	877	2,636
	3.8	1.9	5.7
35001-40000	4,550	4,734	9,283
	9.9	10.3	20.2
40001-45000	1,734	1,725	3,459
	3.8	3.8	7.6
45001-50000	2,610	2,249	4,859
	5.7	4.9	10.6
50001-55000	3,649	2,247	5,896
	8.0	4.9	12.9
55001-60000	1,584	1,200	2,784
	3.5	2.6	6.1
60001- over	1,189	1,156	2,345
	2.6	2.5	5.1
Total	20,541	25,270	45,812
	44.8	55.2	100.0

Table 2.1.8 Tabulation of R.G.V.W. by Carrier Type

UNITS Time	DAYS	WEEKS	MONTHS	YEARS
0	87 0.9	23 0.2	80 0.9	1,914 20.8
1	346 3.7	60 0.7	107 1.0	474 5.1
2	80 0.9	24 0.3	44 0.5	245 2.7
3	79 0.9	14 0.2	51 0.5	703 7.6
4	34 0.4	7 0.1	37 0.4	303 3.3
5	101 1.1	72 0.8	112 1.2	2,686 29.1
6	13 0.1	12 0.1	35 0.4	44 0.5
7	5 0.1	-	11 0.1	8 0.1
8	-	-	3 0.0	8 0.1
9	20 0.2	24 0.3	53 0.6	1,227 13.2
10	13 0.1	-	7 0.1	-
11	-	-	9 0.1	-
12	2 0.0	-	7 0.1	-
15	-	-	13 0.1	-

Table 2.1.9 Duration of Truck Leases

TRUCK TYPE	CARRIER TYPE		
	FOR-HIRE	PRIVATE	TOTAL
Straight Truck	110 1.2	1,794 19.5	1,904 20.7
Tractor only	20 0.2	49 0.5	69 0.7
Truck & Trailer	137 1.5	304 3.3	440 4.8
Tractor & Trailer	1,870 20.3	4,577 49.7	6,447 69.9
Two Trailers (B-train)	49 0.5	71 0.8	120 1.3
Two Trailers (A-train)	56 0.6	82 0.9	138 1.5
Other	23 0.3	76 0.8	99 1.1
Total	2,264 24.6	6,953 75.4	9,218 100.0

Table 2.1.10 Distribution of Leased Truck Types by Carrier

PROVINCE/STATE	FREQUENCY 1983 #	PERCENT 1978 %	PERCENT 1983 %
Alberta	318		0.7
British Columbia	79		0.2
Manitoba	448		1.0
Saskatchewan	66		0.1
Western Provinces	911		2.0
Newfoundland	11		0.0
New Brunswick	133		0.3
Nova Scotia	69		0.2
P.E.I.	19		0.0
Atlantic Provinces	232		0.5
Quebec	2,448	3.8	5.3
Ontario	38,447	90.2	84.0
New York	923		2.0
Michigan	477		1.0
Pennsylvania	231		0.5
Ohio	156		0.3
Florida	102		0.2
All States	2,798		6.1
No data	962		2.1
Total	45,798	94.0	100.0

Table 2.1.11 Distribution of Truck Registration by Province or State

2.2 CARRIER

2.2.1 Industry Segments

There are two main segments in the highway movement of goods i.e. for-hire and private trucks. In this survey an attempt was made to split the main categories into two other categories each. The distribution within the four carrier types is depicted in Table 2.2.1. The information gathered in the survey on this aspect was considered thin and the data was tabulated in the rest of the report in the two main categories. The share of private trucks in terms of truck movements has increased from 42% in 1971 to 51% in 1978 and to 55.2% in this survey. Consequently the share of for-hire trucks has decreased.

Table 2.2.2 shows the share of truck trips by carrier category for each truck type in comparison with the 1978 figures

It shows that most (81%) straight trucks were operated by private carriers. The tractor-trailers and truck-trailers were seen to be more numerous with for-hire than private carriers. In the case of tractors with two trailers the for-hire carriers seem to favour their use by as much as 50% more than the private carriers. The private carriers have increased their share of straight trucks and decreased the share of tractors with trailers in comparison with the 1978 figures.

Table 2.2.3(a) shows the breakdown of body types by carrier type. The breakdown of vans between for-hire and private carriers was 45% to 55%. In the case of car carriers 84% were operated by for-hire carriers and 16% by private carriers. Concrete mixers show the reverse in that about 84% was private and 16% was for-hire. This is understandable since most of the concrete mixer trucks are owned by the concrete mixing establishments.

The magnitude of the different truck body types by carrier type is shown in Table 2.2.3(b). Private carriers have a larger share in all categories except car carriers and dump trucks.

There appears to be a decline in the share of for-hire trucks in the dump, tanker, car-carrier and flatbed body types in 1983 when compared with the 1978 statistics.

2.2.2 Load-volume Utilization

Table 2.2.4 illustrates the load-volume utilization of trucks by type of carrier, both in terms of movements and tonne-km.

It shows that while 48% of the for-hire trucks were fully loaded only 38% of the private trucks carried a full load. In terms of tonne-km the for-hire carriers captured over 54% of all tonne-km of the commodity movement by road. The above results confirm the higher productivity in terms of capacity utilization of for-hire carriers when compared with the private carriers.

2.2.3 Licence Types

This pertains primarily to the registration of trucks rather than to the carriers. However, since it was included under the Carrier section in the questionnaire it is discussed here.

Table 2.2.5 shows the distribution of license categories by carrier type. The split between for-hire and private carriers for the C A V R and Ontario-H T A license types is about the same as the split for the overall population. In the case of the 10-day permits and reciprocity categories the private carriers have between 66% - 75% of the movements in each category.

In terms of absolute numbers, trucks registered in Ontario (H.T.A) show 2600 fewer trucks in this tabulation because they carried C.A.V.R documentation.

2.2.4 Base Province or State

The distribution of trucks by the Province or State in which the vehicles are based is shown in Table 2.2.6.

Comparing Tables 2.1.11 and 2.2.6 the provinces or states in which the trucks are based is not very different from the province or state of registration. In other words the province or state of registration is the base for 92% of the trucks. This was a departure from the findings of the previous survey (1978) where it was found that there were more trucks registered in Ontario than based in Ontario.

2.2.5 Out-of-Province Carriers

From Table 2.1.11 it was seen that about 16% of the trucks were registered outside the Province of Ontario.

Table 2.2.7 shows a cross-tabulation of trucks by Province/ State of registration by carrier type. The incidence of for-hire carriers registered in the Western Provinces is higher than that of private carriers. In the case of Atlantic Provinces taken together the mix of for-hire and private carriers is about the same. As for U S trucks with the exception of trucks registered in Michigan and Ohio states (evenly split) the incidence of private carriers is higher than that of for-hire carriers by 80%.

The incidence of border movements at the different survey locations is shown in the composite Table 3.1.1 under the column heading "Border". The percentage of border trips appears to vary by station and travel corridor. Understandably the incidence of out-of-province trucks across the border stations or in close proximity of the border points is relatively high. For the international border crossings the trucks registered outside the Province averaged at 66.7% of the total movement through them.

2.2.6 Carrier Classification

A new type of carrier classification was attempted at the request of the Truck Transportation Office. The distribution of trips as per this classification is shown in Table 2.2.8. A large percentage(32%) of all trips went empty and a substantial percentage(13.1%) of trips carrying goods could not be categorized and were placed in the Other category. Some of these movements relate to the carriage of food items, chemical products and non-metallic mineral basic products. According to this classification most truck movements fell into the category of General Freight(T L)(16.3%) followed by General Freight(L T L)(6.9%) and lumber & wood products (6.9%).

As noted elsewhere, the "local" movement of freight does not show up in this survey(0.7%). Activity on municipal roads and secondary highways account for most cartage operations and some dump truck operations.

CARRIER	PERCENT		
	1971 %	1978 %	1983 %
PCV For-Hire	57.7	49.4	43.2
PCV Exempt			1.6
Intecorporate	42.3	50.6	0.9
Private			54.3

Table 2.2.1 Distribution of Activity by Carrier Type
(by number of movements)

TRUCK TYPE	FOR-HIRE		PRIVATE	
	1978 %	1983 %	1978 %	1983 %
Straight Truck	23.1	18.7	76.9	81.3
Tractor only	54.4	41.3	45.6	58.7
Truck & Trailer	61.0	54.6	39.0	45.4
Tractor & Trailer	55.3	52.8	44.7	47.2
Two Trailers-B Train		57.8		42.2
Two Trailers-A Train		53.7		46.3
Other	-	29.6	-	70.4

Table 2.2.2 Distribution of Truck Types by Carrier Type

BODY TYPE	FOR-HIRE 1978 %	FOR-HIRE 1983 %	PRIVATE 1978 %	PRIVATE 1983 %
Van(No temp.control)	47.5	46.0	52.5	54.0
Van(temp.controlled)	41.4	37.0	58.6	63.0
Concrete Mixer	13.0	16.2	87.0	83.8
Stake	34.5	37.1	65.5	62.9
Dump	65.2	53.7	34.8	46.3
Tanker	53.9	40.9	46.1	59.1
Car Carrier	89.0	84.6	11.0	15.4
Flat Bed	48.1	41.1	51.9	58.9
Float		48.5		51.5
Other	42.6	35.4	57.4	64.6

Table 2.2.3(a) Share of trips by Carrier for each Body Type

BODY TYPE	FOR-HIRE	PRIVATE	TOTAL
	(- - - # / % of Tot. - - - -)		
Van(no temp.control)	10,103	11,841	21,944
	22.1	25.9	47.9
Van(temp.controlled)	1,437	2,445	3,882
	3.1	5.3	8.5
Concrete Mixer	20	103	122
	0.0	0.3	0.3
Stake	950	1,610	2,560
	2.1	3.5	5.6
Dump	2,051	1,769	3,820
	4.5	3.9	8.4
Tanker	1,681	2,433	4,114
	3.7	5.3	9.0
Car Carrier	1.087	198	1,285
	2.4	0.4	2.8
Flat Bed	2,204	3,154	5,358
	4.8	6.9	11.7
Float	152	160	312
	0.3	0.4	0.7
Other	852	1,554	2,406
	1.9	3.4	5.3
Total	20,538	25,266	45,803
	44.8	55.2	100.0

Table 2.2.3(b) Distribution of Body Types by Carrier

(In terms of movements) LEVEL OF UTILIZATION	CARRIER TYPE For-hire	Private	Total
Empty	5,963 13.0	8,593 18.0	14,555 31.8
Quarter Full	1,171 2.6	2,748 6.0	3,918 8.6
Half Full	1.471 3.2	1,927 4.2	3,398 7.4
Three Quarter Full	1,575 3.4	2,178 4.8	3,754 8.2
Full	9,940 21.7	9,491 20.7	19,431 42.4
Don't Know	417 0.9	327 0.7	744 1.6
Total	20,536 44.8	25,264 55.2	45,800 100.0

(In terms of tonne-km) LEVEL OF UTILIZATION	CARRIER TYPE For-hire %	Private %	Total %
Empty	-	-	-
Quarter Full	1.3	1.7	3.0
Half Full	3.6	2.7	6.3
Three Quarter Full	5.9	5.1	11.0
Full	42.5	35.0	77.5
Don't Know	1.3	0.7	2.0
Total	54.7	45.3	100.0

Table 2.2.4 Load-volume Utilization of Trucks by Carrier Type

LICENCE TYPE	FOR-HIRE	PRIVATE	TOTAL
	(- - - # / % of Tot.- - -)		
C A V R	2,951	3,257	6,209
	6.4	7.1	13.6
Ten-day Permit	62	177	240
	0.1	0.4	0.5
Reciprocity(USA)	821	1,637	2,458
	1.8	3.6	5.4
Ontario(HTA)	16,279	19,561	35,839
	35.5	42.7	78.3
Other	423	630	1,054
	0.9	1.4	2.3
Total	20,536	25,264	45,800
	44.8	55.2	100.0

Table 2.2.5 Distribution of License Categories by Carriers

PROVINCE/STATE	FREQUENCY #	PERCENT %
Alberta	314	0.7
British Columbia	67	0.1
Manitoba	571	1.2
Saskatchewan	64	0.1
Western Provinces	1,016	2.1
Newfoundland	17	0.0
New Brunswick	145	0.3
Nova Scotia	72	0.2
P.E.I.	14	0.0
Atlantic Provinces	248	0.5
Quebec	2,308	5.0
Ontario	38,231	83.5
New York	941	2.1
Michigan	549	1.2
Pennsylvania	217	0.5
Ohio	135	0.3
Florida	140	0.3
All States	2,815	6.1
No data	1,181	2.6
Total	45,799	100.0

Table 2.2.6 Distribution of Trucks by Base Province or State

PROVINCE/STATE	FOR-HIRE #	FOR-HIRE %	PRIVATE #	PRIVATE %	TOTAL #	TOTAL %
Alberta	177	0.4	140	0.3	317	0.7
British Columbia	69	0.2	9	-	78	0.2
Manitoba	248	0.5	201	0.4	449	1.0
Saskatchewan	36	0.1	30	0.1	66	0.1
Western Prov.	530	1.2	380	0.8	910	2.0
Newfoundland	4	-	6	-	10	0.0
New Brunswick	78	0.2	55	0.1	133	0.3
Nova Scotia	34	0.1	35	0.1	69	0.2
P.E.I.	2	-	17	-	19	0.0
Atlantic Prov.	118	0.3	113	0.2	231	0.5
Quebec	951	2.1	1,498	3.3	2,449	5.3
Ontario	17,566	38.4	20,881	45.6	38,447	84.0
New York	240	0.5	683	1.5	923	2.0
Michigan	229	0.5	248	0.5	477	1.0
Pennsylvania	69	0.1	162	0.4	231	0.5
Ohio	72	0.2	84	0.2	156	0.3
Florida	30	0.1	71	0.2	101	0.2
All States	971	2.1	1,828	3.9	2,799	6.0
No data	399	0.8	563	1.2	962	2.0
Total	20,535	44.8	25,263	55.2	45,798	100.0

Table 2.2.7 Distribution by Prov./State of Registration by Carrier Type

CARRIER CLASS	FOR-HIRE #	FOR-HIRE %	PRIVATE #	PRIVATE %	TOTAL #	TOTAL %
1.General Freight(LTL)	1,894	4.1	1,276	2.8	3,170	6.9
2.General Freight(TL)	3,225	7.0	4,220	9.2	7,445	16.3
3.General Freight Local	166	0.4	139	0.3	304	0.7
4.Used Household Goods	165	0.4	223	0.5	387	0.8
5.Live Animals	147	0.3	197	0.4	343	0.7
6.New and Used Autos	1,605	3.5	507	1.1	2,112	4.6
7.Liquid Bulk Tank	584	1.3	952	2.1	1,537	3.4
8.Dry Bulk Tank	173	0.4	197	0.4	370	0.8
9.Dump (aggr.,ore,coal)	662	1.4	343	0.7	1,006	2.2
10.Dimensional Goods	99	0.2	34	0.1	133	0.3
11.Parcel Carriers/couriers	117	0.3	149	0.3	265	0.6
12.Lumber & Wood Products	1,184	2.6	1,966	4.3	3,150	6.9
13.Agricultural Produce	407	0.9	829	1.8	1,236	2.7
14.Air Freight	22	0.0	15	0.0	37	0.1
15.Primary Metal Products	1,148	2.5	960	2.1	2,109	4.6
16.Scrap Metal & Garbage	140	0.3	357	0.8	497	1.1
17.Containers	341	0.7	471	1.0	812	1.8
18.Other	2,403	5.2	3,588	7.8	5,991	13.1
No Data/Empties	6,057	13.2	8,845	19.3	14,902	32.5
Total	20,541	44.8	25,268	55.2	45,809	100.

Table 2.2.8 Distribution by Carrier Classification
(In terms of movements)

2.3 TRIP DETAILS

This section contain trip details such as origin and destination of trips, type of establishment at trip ends, trip length frequency distribution and run type.

2.3.1 Origin-Destination of Trips

The survey was coded to four zone systems, namely the 1978 Weigh Scale Survey zone system, the Province or State, the O W T S(Ontario-Wide Travel Simulation) zone configuration and the Provincial Traffic Zone system.

The percentage breakdown of intra provincial, inter provincial,international and in-transit truck movements for the years 1971, 1978 and 1983 are tabulated below;

TYPE	1971 %	1978 %	1983 %
Intra-provincial	69.0	72.4	69.5
International	23.1	24.6	15.0
Inter-provincial			12.1
In-transit(U.S.A.)	7.9	3.0	2.3
In-transit(Canada)			0.5

Comparable figures in terms of weight of load carried yield the percentage breakdown shown below.

TYPE	1971 %	1978 %	1983 %
Intra-provincial	66.6	66.3	61.9
International	25.1	30.4	18.4
Inter-provincial			15.6
In-transit(U.S.A.)	8.3	3.3	3.2
In-transit(Canada)			0.7

Table 2.3.1 gives the inter-regional truck travel patterns. It was seen that nearly 70% of the truck movements on major highways in Ontario were intra-provincial trips.The extra- Provincial(one trip end being outside the Province) trips form 27% and the balance 3% are in-transit(both trip ends are outside the Province) movements. In terms of weight of freight transported a larger share for the extra-provincial and the in-transit categories are seen.

Additional characteristics and the profile of the international, inter-provincial and in-transit movements are discussed further in Chapter 5.

2.3.2 Establishment Type at Trip Ends

A cross-tabulation of type of establishment at origin against type of establishment at destination is given in Table 2.3.2. The interaction of the truck mode with air, rail and marine terminals is less than 2%. The catchment area for most air, rail and marine terminals overlaps an urban area hence the truck trips attracted or generated through these terminals tend to be primarily urban truck movements. The main movement of truck trips was between manufacturers (12.0%). Another 14% of the trips were between warehouses and or distribution centres.

2.3.3 Trip Length Frequency Distribution

Trip length frequency distributions for the two carrier types are shown in Figure 2.3.1. The distribution of truck trips by distance classes for the industry segments is shown in Table 2.3.3. It is seen that trip lengths of 100 - 150 km are the most numerous for both private and for-hire carriers.

Frequency distributions of truck trip lengths for the two industry segments gave the following results.

CARRIER	MEAN km	MEDIAN km	CASES #
For-hire	380	210	20,362
Private	320	160	24,877
Overall	345	180	45,239

Trips over 1000 km(625 miles) were 5.4% of all trips and the average trip length for private carriers is about 15% less than that of for-hire carriers.

2.3.4 Run Type

Most truck operators when questioned about the type of run reported that the trip was a shuttle run. There appeared to be some confusion in the minds of the operators about the terms TL(truck load) and LTL(less than truck load); see Appendix D for explanation or distinction suggested by interviewer. However, the breakdown for the different run types is shown below;

RUN TYPE	PERCENTAGE
Peddle	19.0
T L (Truck Load)	20.5
L T L (Less Than Truck Load)	2.3
Shuttle	54.3
Local (Cartage)	0.6
Other	1.6
No data	1.8

The local(cartage) movement shown above is less than 1%. This indicates that the movements recorded in this survey were mainly inter-city in nature.

2.3.5 Seasonality of Trip

Only 6.6% of the drivers considered the trip as being seasonal. About 6.3% responded that they did not know or were unsure about the seasonal nature of the trip.

In terms of Truck Movements

ORIGIN	DESTINATION: Western Provinces	Ontario	Quebec	Atlantic Provinces	U S A	TOTAL
Western Provinces	-	579 1.3	95 0.2	12 0.0	14 0.0	700 1.5
Ontario	741 1.6	31,836 69.9	2,281 5.0	116 0.3	3,588 7.8	38,562 84.7
Quebec	24 0.1	1,682 3.7	74 0.2	-	263 0.6	1,943 4.5
Atlantic Provinces	8 0.0	145 0.3	-	-	12 0.0	167 0.4
U S A	27 0.1	3,278 7.2	241 0.5	1 0.0	523 1.1	4,070 8.9
T O T A L	800 1.8	37,520 82.4	2,691 5.9	131 0.3	4,400 9.7	45,542 99.5

Table 2.3.1(a) Inter-regional Truck Travel Matrix

In Terms of Tonnage **

ORIGIN	DESTINATION: Western Provinces	Ontario	Quebec	Atlantic Provinces	U S A	TOTAL
Western Provinces	-	7,703 1.7	1,410 0.3	127 0.0	200 0.0	9,444 2.0
Ontario	9,643 2.1	278,762 61.9	31,410 7.0	1,634 0.4	53,521 11.9	375,026 83.3
Quebec	322 0.1	18,454 4.1	930 0.2	-	4,435 1.0	24,651 5.5
Atlantic Provinces	80 0.0	1,438 0.3	-	-	34 0.0	1,585 0.4
U S A	277 0.1	29,027 6.4	3,031 0.7	30 0.0	6,591 1.5	38,929 8.6
T O T A L	10,323 2.3	335,980 74.6	36,782 8.2	1,793 0.4	64,786 14.4	450,248 99.9

Table 2.3.1(b) Inter-regional Commodity Movement

** The figures shown are in metric tonnes per average day

COUNT ROW % COL. % TOTAL %	ESTAB. AT DESTINATION / ESTAB. AT ORIGIN	AIR*	RAIL*	MARINE*	TRUCK*	POINT OF SALE/ CONSUMPTION	MANUFACTURER	WAREHOUSE	DISTRIBUTION CENTRE	OTHER	DON'T KNOW	TOTAL %
*AIR		33 34.6 30.4 0.1			12 12.4 0.2 –	6 6.4 0.1 –	10 10.1 0.1 –	24 25.3 0.3 0.1		9 10.0 0.1 –	1 1.2 0.1 –	94 0.2
*RAIL			20 9.5 11.0 –	1 0.6 0.6 –	18 8.9 0.4 –	42 20.6 0.8 0.1	40 19.6 0.4 0.1	37 18.0 0.4 0.1	27 13.3 0.5 0.1	19 9.0 0.2 –	1 0.4 0.1 –	205 0.4
*MARINE			1 1.3 0.8 –	15 13.7 7.5 –	9 8.5 0.2 –		20 18.9 0.2 –	35 32.5 0.4 0.1	2 2.0 – –	24 23.0 0.3 0.1		107 0.2
*TRUCK		3 0.1 2.8 –	18 0.4 10.2 –	17 0.3 8.5 –	2162 43.9 41.3 4.7	294 6.0 5.6 0.6	1093 22.2 9.7 2.4	442 9.0 5.1 1.0	294 6.0 5.9 0.6	535 10.9 6.0 1.2	62 1.3 5.7 0.1	4922 10.7
PRIMARY SOURCE			11 0.3 6.3 –	20 0.6 10.4 –	156 4.5 3.0 0.3	673 19.4 12.9 1.5	1279 36.9 11.4 2.8	231 6.7 2.7 0.5	530 15.3 10.5 1.2	545 15.7 6.1 1.2	22 0.6 2.0 –	3467 7.6
MANUFACTURER		30 0.2 28.1 0.1	82 0.5 45.7 0.2	59 0.4 30.0 0.1	1150 7.6 22.0 2.5	2140 14.2 41.1 4.7	5486 36.3 48.9 12.0	2423 16.1 28.0 5.3	1877 12.4 37.4 4.1	1756 11.6 19.7 3.8	92 0.6 8.4	15095 33.0
WAREHOUSE		21 0.2 19.3 –	9 0.1 5.0 –	22 0.3 11.4 –	588 6.8 11.2 1.3	1116 12.9 21.4 2.4	1041 12.0 9.3 2.3	3949 45.6 45.7 8.6	1050 12.1 20.9 2.3	815 9.4 9.2 1.8	49 0.6 4.5 0.1	8660 18.9
DISTRIBUTION CENTRE		9 0.3 8.5 –	24 0.7 13.5 0.1	6 0.2 3.1 –	367 10.6 7.0 0.8	371 10.7 7.1 0.8	716 20.6 6.4 1.6	554 16.0 6.4 1.2	876 25.3 17.4 1.9	527 15.2 5.9 1.1	20 0.6 1.8 –	3470 7.6
OTHER		8 0.1 7.8 –	14 0.2 7.6 –	56 0.6 28.6 0.1	764 8.6 14.6 1.7	553 6.3 10.6 1.2	1493 16.9 13.3 3.3	940 10.6 10.9 2.1	351 4.0 7.0 0.8	4609 52.1 51.8 10.1	57 0.6 5.1 0.1	8845 19.3
DON'T KNOW		3 0.4 3.1 –			13 1.4 0.2 –	11 1.2 0.2 –	31 3.2 0.3 0.1	14 1.4 0.2 –	13 1.4 0.3 –	66 7.0 0.7 0.1	794 84.0 72.3 1.7	945 2.1
TOTAL %		108 0.2	179 0.4	197 0.4	5239 11.4	5206 11.4	11207 24.5	8650 18.9	5023 11.0	8905 19.4	1098 2.4	45811 100.0

*Terminals

Table 2.3.2/ Type of Establishment at Trip End

DISTANCE CLASSES (km)	CARRIER TYPE For-hire	Private	Total
0- 24.9	354 0.8	747 1.6	1,100 2.4
25.0- 49.9	1,187 2.6	1,555 3.4	2,742 6.0
50.0- 74.9	1,408 3.1	2,103 464	3,511 7.7
75.0- 99.9	1,356 3.0	2,717 5.9	4,073 8.9
100.0-149.9	2,914 6.4	4,741 10.3	7,656 16.7
150.0-199.9	2,380 5.2	2,793 6.1	5,173 11.3
200.0-249.9	1,648 3.6	1,727 3.8	3,375 7.4
250.0-299.9	1,168 2.5	1,072 2.3	2,240 4.9
300.0-399.9	2,795 6.1	1,886 4.1	4,681 10.2
400.0-499.9	1,396 3.0	1,096 2.4	2,492 5.4
500.0-749.9	1,846 4.0	2,125 4.6	3,971 8.7
750.0-999.9	690 1.5	1,010 2.3	1,701 3.7
1000 -over	1,214 2.7	1,250 2.7	2,464 5.4
Total	20,542 44.8	25,270 55.2	45,812 100.0

Table 2.3.3 Distribution of Trips by Distance Classes for the two Carrier Types

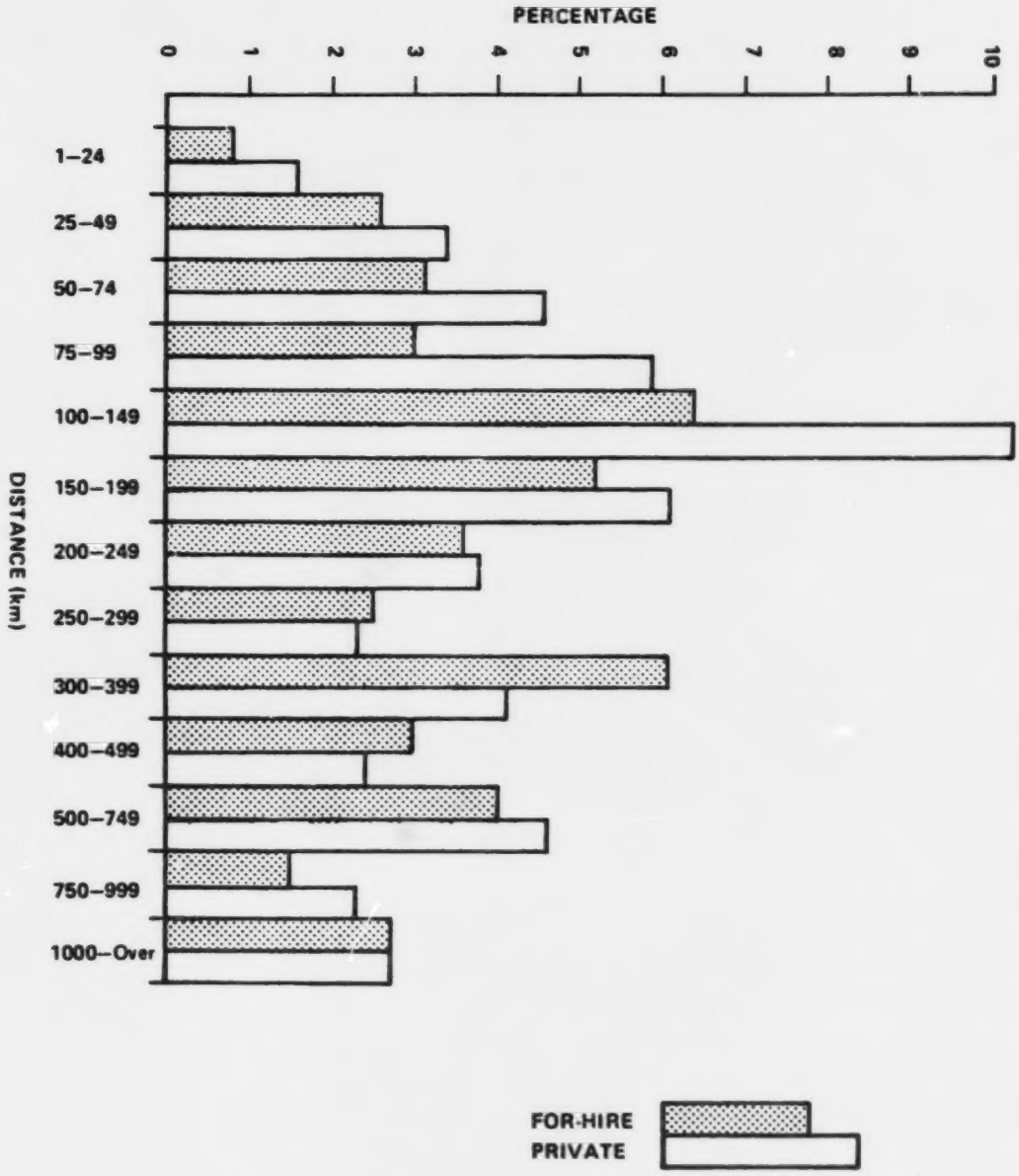


Figure 2.3.1 / Trip Length Frequency Distribution by Carrier Type

2.4 LOAD

2.4.1 Load-Volume Utilization

The responses recorded herein relate to the drivers perception of space utilization. It is quite possible that some drivers might have based their judgement purely on the basis of volume availability, rather than on capacity utilised within the allowable registered gross vehicle weight.

Table 2.4.1 gives the distribution of trips at five levels of load-volume utilization in terms of movements and trip distances for the surveys in 1978 and 1983. Compared with the 1978 Survey a slightly higher percentage (5.2% more) of empty truck movements was seen. Accordingly a lower percentage (7.6% less) of fully loaded truck movements were observed. In terms of distance travelled the distribution of trips is not very much different from the 1978 distribution except for a reduction in the percent of fully loaded trips.

2.4.2 Gross Vehicle Weight and Axle Loads

Trend data on vehicle size and weight is required in policy analysis and planning activities. However, increasing interest in pavement deterioration has begun to focus attention on the need for better data on axle loads. A detailed analysis of the data relating to axle loads will be carried out by the Ministry as a separate project.

Frequency distributions of actual gross vehicle weights for the industry segments gave the following statistics.

CARRIER	MEAN kg	MEDIAN kg	MODE kg	CASES #
For-hire	26,700	22,750	16,600	19,203
Private	20,600	16,600	13,500	23,135
Overall	23,300	19,140	16,600	42,338

The distribution of actual gross vehicle weights for the vehicles surveyed is as shown in Table 2.4.2. The average actual gross vehicle weight is 23,300 kilograms. This is about 63% of the average R G V W of all trucks passing through the survey stations.

2.4.3 Weight of Load Carried

The commodity weight and weight of load carried is one and the same only if a single commodity is being carried. This is so only for 60% of the movements, another 30% of tne movements had no commodity aboard and hence 10% of the movements were carrying more than one commodity. Generally one waybill refers to one commodity. At other times several waybills are associated with the same commodity destined to several consignees and occasionally one waybill may include several commodities. For this survey single commodity waybills were selected wherever possible for coding.

Table 2.5.4 shows a frequency distribution by commodity weight classes. Without taking into consideration the 1 - 2400 kg weight class most loads carried by for-hire carriers fall into the weight class 15,000 - 20,000 kg. The private carriers transport lighter loads and they are most numerous in the weight class 5,000 - 10,000 kg.

2.4.4 Load Factor

The distribution of actual gross vehicle weights recorded at the weigh scales was shown in Table 2.4.2. There is a variance between the average actual gross vehicle weight and the average registered gross vehicle weight for the population. A load- factor may be defined to obtain an appreciation of the comparative degree of loading of trucks operated by the two carrier types;

$$\text{Load-Factor} = \frac{(\text{Mean Actual G.V.W} - \text{Mean Tare Weight})}{(\text{Mean R.G.V.W} - \text{Mean Tare Weight})}$$

Substituting the values obtained in sections 2.1.6, 2.1.7 and 2.4.2 for the-mean R.G.V.W, actual R.G.V.W and the tare weight in the above equation, the load-factor values for the for-hire and private carriers yield 0.55 and 0.51 respectively.

2.4.5 Overloading

The subject of overloading can be broken down into two areas, namely (a) gross overloading and (b) axle overloading.

(a) Gross overloading

This may occur when the R.G.V.W is exceeded. Incidences of gross overloading detected in the survey was about 3.5%. This statistic was obtained by comparing the aggregate axle loads with the R.G.V.W. The R.G.V.W does not necessarily reflect the gross carrying capacity of the vehicle.

(b) Axle overloading

This is a complex area requiring additional data such as axle spacing, spacing between axle groups, type of suspension, and width of tires. Due to time constraints this data was not collected in the survey. Incidence of axle overloading cannot be established with the data on hand.

It is likely that the statistic given above may be unrepresentative because of scale avoidance tactics of overweight trucks. Even though the regular enforcement activities were suspended for the duration of the survey, they may nevertheless feel that it is not in their best interest over the short and long term to be weighed when carrying overloads. This suggests that this statistic understates actual incidences of overloading.

LEVEL OF UTILIZATION	1978		1983	
	Movements %	Distance %	Movements %	Distance %
Empty	26.6	20.4	31.8	22.1
Quarter Full	8.6	4.9	8.6	5.9
Half Full	7.9	7.6	7.4	7.2
Three Quarter Full	6.9	5.7	8.2	8.5
Full	50.0	61.4	42.4	54.3
Don't Know	-	-	1.6	2.0
Total	100.0	100.0	100.0	100.0

Table 2.4.1 Load-volume Utilization of Trucks

ACTUAL GROSS WEIGHT(kg)	CARRIER TYPE For-hire	Private	Total
0- 2400	14	51	65
	0.0	0.1	0.1
2401- 5000	189	1,586	1,775
	0.4	3.5	3.9
5001-10000	1,083	4,278	5,361
	2.4	9.3	11.7
10001-15000	2,488	4,118	6,604
	5.4	9.0	14.4
15001-20000	4,341	4,139	8,480
	9.5	9.0	18.5
20001-25000	2,435	2,194	4,629
	5.3	4.8	10.1
25001-30000	1,883	1,555	3,438
	4.1	3.4	7.5
30001-35000	2,569	1,850	4,420
	5.6	4.0	9.6
35001-40000	1,465	1,335	2,800
	3.2	2.9	6.1
40001-45000	621	574	1,194
	1.4	1.3	2.6
45001-50000	897	548	1,445
	2.0	1.2	3.2
50001-55000	681	451	1,132
	1.5	1.0	2.5
55001-60000	291	232	523
	0.6	0.5	1.1
60001- over	250	222	471
	0.5	0.5	1.0
Total	20,542	25,271	45,812
	44.8	55.2	100.0

Table 2.4.2 Distribution of Actual Gross Vehicle Weights by Weight Classes and Carrier Types

2.5 COMMODITIES

This subsection introduces the commodity flow data that was coded in the survey from a sample (47%) of the waybills photocopied in the survey, together with data collected directly from the truckers(10,180) carrying commodities without waybills. The movement of hazardous goods was also examined.

2.5.1 Type of Commodities Carried

A partial listing of the most frequently carried commodities and their distribution is given in Table 2.5.1.

The twelve most frequently carried commodities together represent 39% of the total number of truck movements. They also account for 62% of the total tonnage moved. Comparing these figures with those obtained in the 1978 Commercial Truck Survey a redistribution of the truck movements was noted, together with the inclusion of commodities not ranked before.

Table 2.5.2 shows the type of carrier transporting the top twelve commodity groups. It was seen in the 1978 survey for-hire trucks were mainly engaged in the movement of crude non-metallic minerals, cars and general freight. In this survey for-hire carriers appear to have a larger share of the movement of commodity groups such as general freight, road motor vehicles and automotive parts, iron/steel alloys, paper/paper board and crude non-metallic minerals. Commodity groups such as wood fabricated materials, beverages and food items are more often carried by private carriers.

2.5.2 Origin-Destination of Commodities Transported

Commodities identified in this survey were coded to a modified version of Statistics Canada two-digit Standard Commodity Classification Code as shown in Appendix E.

The commodity movement in terms of the four zonal systems may be constructed if necessary. For the sake of simplicity, however the commodity movement in terms of the five main regions is shown in Appendices F, G and H.

2.5.3 Weight of Commodities

The average weight of load for the most frequently carried commodities is shown in Table 2.5.3

Table 2.5.4 shows the truck trips by commodity weight classes for the two industry segments.

Movement of commodities such as crude non-metallic minerals, crude wood materials, iron/steel alloys and wood fabricated materials show average loads of 24.2, 23.8, 20.5 and 20.3 tonnes respectively. Considering all commodities, the average loads carried by for-hire carriers and private carriers are 16.5 and 13.1 tonnes respectively.

Frequency distributions of commodity weight for the industry segments yield the following results.

CARRIER	MEAN kg	MEDIAN kg	MODE kg	CASES #
For-hire	16,550	15,700	20,000	14,394
Private	13,100	9,100	30,000	16,147
Overall	14,700	12,900	30,000	30,541

The for-hire carriers on average appear to carry average loads of about 25% more than that for private carriers.

2.5.4 Dangerous Goods

Dangerous goods form 8.1% of all truck movements and in terms of tonnage they make-up 12.3% of all goods movement. Flammable and combustible liquids were found to form 63.0% of this movement. The most frequently carried dangerous commodity was gasoline.

Additional material on the dangerous goods movement and other related results of analysis appear in Chapter 4.

2.5.5 Waybills

A distribution of the number of waybills carried in the trucks is shown in Table 2.5.5. In the case of about 20% of those surveyed the

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waybills were either not available or were not copied due to logistical problems; however the commodity data as divulged by the drivers was recorded. Nearly 60% of the movements were carrying just one commodity.

A number of truck operators stated that the waybill has been conveyed by electronic transmission. This number was less than one-tenth of one percent.

COMMOD	COMMODITY	MOVEMENTS 1978	MOVEMENTS 1983	TONNAGE 1983
No.	Groups	%	%	%
99	Commodities that do not fall into any other category.	11.0	6.7	6.8
58	Road Motor Vehicle and automotive parts	7.2	6.3	8.3
44	Iron,steel and Alloys	6.6	3.7	7.7
14	Foods,Food Materials and Food Preparation	3.2	3.1	3.9
35	Paper and Paper-Board	3.5	3.1	4.6
27	Crude Non-metallic Minerals(except coal and Petroleum)	6.0	2.6	6.4
33	Wood Fabricated Materials	4.1	2.6	5.3
47	Non-metallic mineral Basic Products	4.0	2.5	4.9
95	Containers and closures	1.0	2.2	2.0
23	Crude Wood Materials	-	2.2	5.3
42	Chemical and Related Products	1.5	2.1	3.1
17.	Beverages	1.7	2.0	3.7
01.	Meat and Meat Products	2.0	1.9	1.6
	All Other Groups	48.2	58.2	36.4
	Total	100.0	100.0	100.0

Table 2.5.1 Distribution of the Most Frequently Carried Commodities

COMMOD No.	COMMODITY Groups	CARRIER TYPE For-Hire	Private	Total
99	Commodities that do not fall into any other category.	2,016 4.4	1,056 2.3	3,071 6.7
58	Road Motor Vehicle and automotive parts	2,120 4.6	761 1.7	2,880 6.3
44	Iron,steel and Alloys	958 2.1	738 1.6	1,696 3.7
14	Foods,Food Materials and Food Preparation	581 1.3	838 1.8	1,419 3.1
35	Paper and Paper-Board	713 1.6	699 1.5	1,412 3.1
27	Crude Non-metallic Minerals(except coal and Petroleum)	751 1.6	440 1.0	1,191 2.6
33	Wood Fabricated Materials	421 0.9	761 1.7	1,183 2.6
47	Non-metallic mineral Basic Products	578 1.3	589 1.3	1,167 2.6
95	Containers and Closures	474 1.0	554 1.2	1,028 2.5
23	Crude Wood Materials	264 0.6	737 1.6	1,002 2.2
42	Chemical and Related Products	405 0.9	553 1.2	957 2.1
17.	Beverages	361 0.8	564 1.2	924 2.0
01	Meat and Meat Products	244 0.5	625 1.4	868 1.9
	Other Commodities	4,545 9.9	7,675 16.8	12,220 26.7
	Empties & No data	6,110	8,678	14,788
	Total	20,541	25,268	45,809

Table 2.5.2 Frequently Carried Commodities by Carrier Type

COMMOD No.	COMMODITY Groups	CARRIER TYPE For-Hire tonne	Private tonne	Total tonne
27	Crude Non-metallic Minerals(except coal and Petroleum)	24.72	23.20	24.16
23	Crude Wood Materials	22.44	24.32	23.80
44	Iron,steel and Alloys	23.47	16.74	20.54
33	Wood Fabricated Materials	24.19	18.16	20.29
47	Non-metallic mineral Basic Products	21.22	16.53	18.85
17	Beverages	19.75	17.22	18.23
42	Chemical and Related Products	17.04	13.13	14.80
35	Paper and Paper-Board	17.20	11.93	14.59
58	Road Motor Vehicle and automotive parts	14.04	10.07	12.99
14	Foods,Food Materials and Food Preparation	16.28	9.61	12.34
99	Commodities that do not fall into any other category.	10.00	9.88	9.97
95	Containers and Closures	8.53	9.24	8.92
01	Meat and Meat Products	13.15	6.36	8.27
	All Groups	16.50	13.10	14.52

Table 2.5.3 Average Weight of Load for the Most Frequently Carried Commodities

COMMODITY WEIGHT(kg)	CARRIER TYPE For-hire	Private	Total
No data	1,337	2,361	3,698
	4.4	7.7	12.1
1- 2400	1,768	3,535	5,303
	5.8	11.6	17.4
2401- 5000	1,153	2,163	3,316
	3.8	7.1	10.9
5001-10000	1,988	2,740	4,728
	6.5	9.0	15.5
10001-15000	1,974	1,616	3,590
	6.5	5.3	11.8
15001-20000	2,623	2,010	4,633
	8.6	6.6	15.2
20001-25000	1,825	1,373	3,198
	6.0	4.5	10.5
25001-30000	829	953	1,782
	2.7	3.1	5.8
30001-35000	1,183	770	1,952
	3.9	2.5	6.4
35001-40000	538	467	1,005
	1.8	1.5	3.3
40001-45000	287	244	531
	0.9	0.8	1.7
45001-50000	66	111	177
	0.2	0.4	0.6
50001-55000	52	69	121
	0.2	0.2	0.4
55001- over	109	95	204
	0.4	0.3	0.7
Total	14,394	16,146	30,540
	47.1	52.9	100.0

Table 2.5.4 Movement by Commodity Weight Classes for the Two Carriers

NUMBER OF WAYBILLS	FREQUENCY	TOTAL
No waybills	24,160	—
1	17,159	17,159
2	1,913	3,826
3	786	2,358
4	366	1,464
5	277	1,385
6	235	1,410
7	144	1,008
8	176	1,408
9	50	450
10	122	1,220
11	62	682
12	68	816
13	19	247
14	47	658
15	36	540
16	34	544
17	12	204
18	16	288
19	4	76
20	20	400
21>	89	2,266
TOTAL	45,797	38,409

Table 2.5.5 Distribution of the Number of Waybills Carried

2.6 TRUCK TRAFFIC

2.6.1 Hourly Traffic Distribution

Hourly traffic distributions at some of the survey locations are shown in Table 2.6.1. Figure 3.8.1 depicts the hourly distribution of the aggregate truck traffic. The fluctuation in traffic is different for each station and is location specific.

Due to daily and seasonal variation a departure from the distribution shown in the tabulation referred to above is quite likely. However, for a typical day generally it can be said that the truck traffic was heaviest during the hours of 0900 - 1500. About 70% of the daily traffic occured during the hours of 0700 - 1900.

2.6.2 Daily Traffic Distribution

Due to the method of survey adopted the daily variation in truck traffic for a typical week cannot be generated. However, the tabulation below shows the distribution of total traffic passing through the stations on each day of the week the survey was conducted. This must not be construed as the typical distribution of truck traffic over a week.

DAY	TRAFFIC	%
Sunday	116	0.3
Monday	5,822	12.7
Tuesday	9,111	19.9
Wednesday	15,175	33.1
Thursday	8,133	17.8
Friday	7,103	15.5
Saturday	350	0.8

2.6.3 Short/Long Truck Split

Commercial vehicles may be broadly divided into single units and combination units. Single units are further subdivided into light 2 axles and heavy 2,3 or 4 axles. In the case of 2 axles trucks, the distinction between a light and heavy depends on whether the rear axle carried 2 or 4 wheels. Combination units include transport trucks comprising a truck/ tractor towing one or more trailers. They are regarded as heavy trucks. The Commercial Vehicle Survey 1983 did not include the light 2 axles category, as they are not required to pass through the truck inspection stations. Figure 2.6.1 depicts the division of short and long trucks and their relationship to light and heavy trucks in a broad sense. For the purpose of classification counts the heavy 2,3 or 4 axles trucks are referred to as short trucks and the combination units are treated as long trucks.

Appendix I shows the short/long truck split at some of the survey locations.

In terms of absolute numbers the largest number of long trucks passed through the inspection stations located at Whitby (3716 trucks), Oakville (3526 trucks), Streetsville N. (3526 trucks) and Streetsville S (3264 trucks). The incidence of long trucks was heaviest across the border crossings at Sault Ste Marie and Pigeon River being 95% of all truck traffic passing through at each point.

HOUR ENDING	STREETSVILLE N.	WINONA	PUTNAM N.	GANANOQUE N.	GRAVENHURST	NIPIGON W.	LANSDOWNE
0100	2.0	2.6	2.5	3.1	3.4	1.4	4.2
0200	1.4	1.8	2.6	2.9	3.5	0.5	2.4
0300	1.0	1.1	3.2	3.4	2.6	0.9	2.9
0400	1.6	1.1	2.4	2.0	0.8	0.6	1.2
0500	1.1	1.6	2.1	1.8	-	0.7	4.0
0600	3.2	2.7	4.4	2.7	-	0.7	2.5
0700	4.1	4.0	4.1	6.0	-	4.0	2.3
0800	6.1	5.3	7.5	3.8	5.2	3.4	4.5
0900	4.3	7.9	4.6	3.5	4.2	3.9	5.5
1000	6.3	8.7	4.5	3.6	4.5	5.3	4.9
1100	7.9	6.4	5.1	5.6	4.1	9.0	5.0
1200	7.5	6.3	5.6	4.3	6.4	7.5	3.8
1300	6.6	5.9	6.1	4.4	7.3	3.3	8.1
1400	8.1	6.2	5.9	4.5	7.4	6.0	4.0
1500	6.0	6.0	4.6	5.4	14.1	5.2	2.5
1600	7.6	6.7	4.8	5.0	5.2	8.6	5.9
1700	6.6	4.7	6.5	4.2	7.5	5.0	7.9
1800	5.1	5.6	4.8	5.8	4.8	10.3	3.9
1900	3.4	3.5	3.3	5.2	2.7	5.5	5.7
2000	2.3	2.8	2.9	6.0	2.0	2.9	7.0
2100	2.5	2.2	3.9	4.7	4.3	5.4	2.4
2200	1.7	2.5	3.4	4.1	3.1	2.7	7.0
2300	1.7	2.4	1.2	3.5	2.4	3.4	1.7
2400	1.6	2.0	4.0	4.4	4.5	1.8	0.7

Table 2.6.1 Trucks by Hour of the Day - Selected Stations

TYPE	SHORT TRUCKS		LONG TRUCKS
UNITS	SINGLE UNITS		COMBINATION UNITS (TRUCK–TRAILER, TRACTOR – TRAILER/S)
AXLES	2 AXLES – 2 TIRES ON REAR AXLE	2, 3 & 4 AXLES – 4 TIRES ON REAR AXLE/S	3 OR MORE AXLES TRANSPORTS
WEIGHT	GENERALLY LESS THAN 5 500 kg *	MAX. 38 300 kg*	MAX. 63 500 kg*
LENGTH		MAX. 12.5 m*	MAX. 21 m*
BODY STYLES	VANS, PICKUP	DUMP, STAKE, TANKER, BOX, TOW TRUCK, BOX	TRACTOR TRAILERS, FLATBED, TANKER TRALERS, CAR CARRIERS
	LIGHT TRUCKS	HEAVY TRUCKS	

* Weights and Dimensions given are the Legal Limits.

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Figure 2.6.1 / Short / Long Trucks and their Relationship to Light / Heavy Trucks

2.7 DRIVER

2.7.1 Driver Employment

A tabulation of driver employment categories by industry segment is shown in Table 2.7.1. The majority (82%)of the drivers reported that they were company employees. The percentages for drivers employed by agency and broker firms are relatively small at 2.5% and 5.5% respectively.

The majority of the company drivers (55%) are employed by private carriers. Private carriers seem to engage agency drivers much more than for-hire carriers. However, the for-hire carriers appear to lean towards brokers much more than private carriers.

For those drivers who have been employed by an agency the duration of work for a particular shipper is shown in Table 2.7.2. About half of the drivers working for agencies have done so for one or more years. Nearly a third showed some reluctance to answer the question about the duration of employment.

DRIVER EMPLOYMENT	FOR-HIRE	PRIVATE	TOTAL
	(- - # / % of Tot. - - -)		
Broker	1,876	659	2,534
	4.1	1.4	5.5
Company Driver	16,584	21,138	37,722
	36.2	46.2	82.4
Self	1,670	2,015	3,685
	3.6	4.4	8.0
Driver Agency	145	1,001	1,146
	0.3	2.2	2.5
Don't Know	260	450	710
	0.6	1.0	1.5
Total	20,535	25,262	45,797
	44.8	55.2	100.0

Table 2.7.1 Distribution of Driver Employment Categories by Carrier Type.

UNITS	DAYS	WEEKS	MONTHS	YEARS
0	18 1.6	9 0.8	24 2.1	175 15.3
1	32 2.8	-	14 1.2	57 5.0
2	24 2.1	4 0.4	28 2.4	70 6.1
3	17 1.9	1 0.1	29 2.5	61 5.4
4	4 0.4	19 1.7	1 0.1	40 3.5
5	36 3.1	9 0.8	6 0.5	88 7.7
6	-	4 0.3	13 1.1	5 0.4
7	-	5 0.4	16 1.4	9 0.8
8	-	-	2 0.2	-
9	12 1.0	2 0.2	36 3.1	50 4.4
10	-	-	-	16 1.4
12	1 0.1	-	-	4 0.4
15	-	-	-	5 0.5
30	-	-	1 0.1	-

Table 2.7.2 Distribution of Periods of Employment of Drivers from Driver Agencies

3.0 EMPTY TRUCK MOVEMENTS

This chapter documents results of analysis relating to the empty truck movements. It does not attempt to explain or ascertain the reasons for the empty truck movement.

When dealing with the question of empty trucks it is relevant to focus on the volume utilization of trucks as perceived by the truck drivers. Some trucks are sealed and the driver was the only person who could advise on the truck utilization. The use of either a weight or volume criterion was left to the driver, who presumably judged utilization by the more critical factor in his experience. Only in the case of an empty movement would these two utilization criteria be the same.

3.1 INCIDENCE OF EMPTY TRUCKS

The incidence of empty truck movements was seen to vary for each station. This is seen from the composite Table 3.1.1 under the column heading "Empty". It shows a low of 8.1% at the Thunder Bay East station and a high of 49.4% in Woodbridge. The provincial average of completely empty movements stands at 31.8% and another 24.2% of the movements carried less than a full load.

The percent of empty trucks was seen to be high for stations located closer to large urban centres. Survey locations at Woodbridge(49.4%), Oakville(40.1%), and Streetsville N.(40.1%) are typical of this situation.

3.2 EMPTY MOVEMENT AT DIFFERENT PARTS OF THE PROVINCE

The variation in the empty movement at different districts of the Province is shown in Table 3.2.1.

The highest incidence of empty truck movement occured in the Central Region and in all three Districts within this Region the percent of empty movements was uniform at about 35%. The Districts of Thunder Bay (9.2%), Sault Ste Marie (17.0%) and Kenora (20.1%) in that order recorded the lowest incidence of empty movements.

3.3 EMPTY MOVEMENT AND TYPE OF CARRIER

The utilization of capacity by type of carrier is shown in Table 2.2.4. It is seen that the incidence of empty truck movement for the private carriers is about 17% higher than that for the for-hire carriers. The same observation was recorded in the 1978 Survey.

In terms of truck kilometers travelled from Table 2.4.1 it was seen that empty trips form 22% of the distance covered by all trucks. This indicator obtained in the 1978 survey was somewhat lower (20%).

A breakdown by capacity utilization categories and carrier type in terms of truck-kilometres is shown in Table 3.3.1. This tabulation demonstrates that there were more for-hire carriers moving with full and fewer for-hire trucks moving completely empty than private carriers.

Private carriers are restricted to carrying a company's own goods only. This restriction has been removed for companys able to obtain a Certificate of Intercorporate Exemption. However, not many such certificates surfaced over the survey. This is quite understandable when one considers that only 95 Certificates of Intercorporate Exemption have been issued at the time of survey (August 1983).

3.4 EMPTY MOVEMENT AND TRUCK CHARACTERISTICS

Table 3.4.1 shows the distribution of empty movements for different truck types and body types.

Two-thirds (66%) of the empty return trips were tractor-trailer combinations followed by straight trucks (25%). These figures are generally in line with the distribution of truck types in the population (See Table 2.1.1), but with a difference. Table 3.4.2 shows that a higher incidence of empty movements occured among straight trucks than tractor- trailers. In other words the straight trucks are more likely to be run empty on a return trip and the tractor-trailers are less likely to go without a backhaul.

Trucks and tractor-trailers with van type body type form the predominant group (45%) in the empty movement. Tankers (14%) and flatbeds (12%) are the other significant categories of body type. Vehicles such as dump trucks, tank trucks and concrete mixers showed a relatively high percentage (over 43%) of empty movements.(see Table 3.4.3). In the case of concrete mixers and tankers the percent empty movement tend to the theoretical value of 50% where empty backhauls cannot be avoided. The high incidence of empty movements in these categories is due to the specialized nature of these trucks.

3.5 EMPTY MOVEMENT AND TRIP LENGTHS

Figure 3.5.1 show the distribution of truck movements by distance intervals for empty and loaded trucks. The percentage of empty trucks gradually diminished as the trip length increased. In other words the incidence of empty truck movements is related to the trip lengths. This indicates the natural reluctance of trucking firms to despatch goods over long distances without assurances of a pay load on some part of the return trip.

Frequency distributions of empty truck trip lengths for the two industry segments gave the following results.

CARRIER	MEAN km	MEDIAN km	CASES #
For-hire	237	158	5,860
Private	247	135	8,367
Overall	243	142	14,227

Although half the trips made by private carriers were less than 135 km they also engage in enough long distance trips to skew the distribution to yield a mean trip distance of 247 km. The situation in the case of the for-hire carriers is similar. The empty trips tend to be shorter than the loaded runs. Trips over 1000 km(625 miles) were 2.2% of all trips.

3.6 EMPTY MOVEMENTS AND ORIGIN-DESTINATION OF TRIPS

Table 3.6.1 shows the distribution of the intra-provincial, extra-provincial and intransit(overland) empty movements.

TYPE	1971 %	1978 %	1983 %
Intra-provincial	69.0	72.4	78.0
Inter-provincial	19.8	16.6	7.0
International	3.3	8.0	12.6
In-transit	7.9	3.0	1.2

In terms of the Ontario-Wide Travel Simulation zone system the highest percentage of empty truck trips appear to originate from zone

79(Toronto and its surroundings). Destination of the highest percentage of empty truck trips is zone 68 (Mississauga).

The incidence of empty movements for extra-provincial trips tend to change for different origins and destinations. For example, for trips originating in Ontario and destined to the Atlantic Provinces only 16% were travelling empty. In contrast 30% of movements from the Atlantic Provinces to Ontario were running empty. Almost the same pattern of empty movements is seen in respect of movements to and from U S A to Ontario. The incidence of empty trips from the U S A to Ontario is about 37% while the incidence of empty runs from Ontario to U S A is about 16%.

3.7 ENERGY SAVING DEVICES ON EMPTY TRUCKS

Table 3.7.1 shows the incidence of energy saving devices on trucks moving empty as compared with the survey population. The incidence (16%) of bubble devices and air deflectors on empty trucks is less than that for the population (22%). This can be attributed to the high incidence of empty movements among straight trucks and the low usage of energy saving devices on them.

3.8 HOURLY AND DAILY VARIATION OF EMPTY MOVEMENT

Figure 3.8.1 illustrates the distribution of empty movements on the provincial highway system by the hour of the day in comparison with the distribution for the population. This treatment is necessary due to limitations in the sampling procedure. The incidence of empty movements was seen to be low during the morning hours and gradually increased towards mid-afternoon peaking about 1600 hours. This same pattern was identified in the 1978 survey and is consistent with the hypothesis that they relate to trucks returning empty after delivery of goods.

The incidence of empty movements between the hours of 2200 - 0800 was observed to be relatively low (less than 25%). Further, about 55% of the trucks travelling during this period were found to be fully loaded, in comparison with a figure of 38% of fully loaded trucks travelling outside these hours.

Table 3.8.1 shows the percentage of empty movements by day of the week. The incidence of empty movements during the work week appeared to fluctuate between a low of 26.1% on Thursday to a high of 35.5% on Friday. Although the sample surveyed on Sunday was relatively small the incidence of empty movements was seen to be low (7%).

3.9 EMPTY MOVEMENT OF LEASED TRUCKS

The incidence of empty movements for leased trucks is 28.2% in comparison with 32.9% for the non-leased category as seen in Table 3.9.1.

The type of truck leased by carrier category is shown in Table 3.9.2. About 77% of the empty leased trucks were operated by private carriers. Van type trucks form 57% of the leased empty trucks. Not one empty concrete-mixer showed up in the sample; there is an apparent undersampling in this category.

STATION LOCATION		TOTAL TRAFFIC	PERCENTAGE EMPTY	DANGEROUS	BORDER
REGION 2- CENTRAL		#	%	%	%
District					
Toronto East	210 Whitby	4562	26.8	8.0	18.5
21	211 Bowmanville	3401	41.4	4.5	18.9
	212 Woodbridge	2101	49.4	5.1	10.3
	213 King	1409	34.8	7.8	6.0
Toronto West	221 Streetsville S	3682	28.7	5.9	9.2
22	222 Streetsville N	4273	40.1	3.4	8.7
	223 Cooksville	514	29.1	5.1	1.2
	224 Victoria	603	31.0	3.6	2.6
Hamilton	230 Winona	3567	25.5	11.8	40.0
23	231 Oakville	4622	40.1	8.8	13.9
	232 Fruitland	3423	37.0	14.2	30.4
	233 Fort Erie	1022	41.2	8.3	74.0
	234 Bismarck	223	37.5	2.6	5.1
REGION 3- SOUTHWESTERN					
London	311 Putnam N	3251	24.1	7.5	26.6
31	312 Putnam S	2977	35.6	7.0	24.7
Windsor	321 Windsor N	1887	23.7	5.8	45.2
32	322 Windsor S	1662	31.3	5.9	40.5
	323 Sarnia N	724	39.9	13.3	37.8
	324 Sarnia S	541	38.0	21.0	33.2
REGION 4- EASTERN					
Kingston	411 Gananoque N	1912	29.8	7.1	62.0
41	412 Gananoque S	1725	15.6	6.8	68.5
	413 Lancaster N	588	20.5	5.7	98.0
	414 Lancaster S	1593	18.8	7.3	98.5
	415 Prescott N	1644	27.4	5.2	64.7
Ottawa	421 Alfred E	344	37.5	2.7	52.2
42	422 Glen Tay W	910	27.6	4.7	17.8
	423 Pembroke	1121	29.4	9.5	34.0
	424 Casselman	401	28.0	13.5	64.5

Table 3.1.1 % Empty, % Dangerous and % Border Traffic(Contd.)

STATION LOCATION		TOTAL TRAFFIC #	PERCENTAGE EMPTY %	DANGEROUS %	BORDER %
REGION 5- NORTHERN					
District					
North Bay	511 North Bay S.	448	43.2	11.4	9.6
51	512 North Bay W	285	22.9	8.7	8.4
	514 Gravenhurst	455	40.4	6.3	9.6
	516 Huntsville W	214	43.4	4.6	4.9
N Timmins	521 Cochrane S	390	23.8	7.6	23.1
52	522 Hearst W	349	34.2	3.4	32.4
	523 New Liskeard S	379	26.7	9.3	27.7
S.Ste Marie	531 S. Ste. Marie E	356	27.3	8.6	20.5
53	532 Spragge W	592	9.5	11.6	19.6
REGION 6- NORTHWESTERN					
Thunder Bay	612 Thunder Bay E	603	8.1	5.9	37.3
61	613 Nipigon W	754	10.2	11.3	32.1
Kenora	621 Dryden E	583	9.8	4.1	40.9
62	622 Vermillion Bay E	563	28.6	7.7	44.4
	623 Keewatin E	593	15.7	15.7	80.5
	624 Crozier E	267	29.7	7.9	28.3

INTERNATIONAL BORDER CROSSINGS

STATION LOCATION	TOTAL TRAFFIC #	PERCENTAGE EMPTY %	DANGEROUS %	BORDER %
746 Cornwall	192	22.9	14.9	98.8
758 Prescott	26	25.8	46.5	100.0
753 Lansdowne	678	25.0	17.6	98.2
744 Queenston	679	38.9	10.4	88.9
747 S.Ste Marie	145	42.1	1.6	89.6
756 Pigeon River	164	30.0	3.3	100.0
751 Fort Frances	131	45.5	14.8	98.4
759 Rainy River	23	23.6	13.2	100.0

INTER-PROVINCIAL BORDER CROSSINGS

884 Temiscaming Hwy 63	130	31.5	10.6	75.8
885 New Liskeard Hwy 65	232	17.8	6.2	93.0
886 E of Kirkland Lake	46	23.3	12.0	17.2

Table 3.1.1 % Empty, % Dangerous and % Border Traffic

	TOTAL MOVEMENTS	TOTAL EMPTY	PERCENT EMPTY
CENTRAL			
Toronto East	8,395	3,049	36.3
Toronto West	7,216	2,469	34.2
Hamilton	10,583	3,735	35.3
Total	26,194	9,253	35.3
SOUTHWESTERN			
London	3,990	1,178	29.5
Windsor	3,387	1,023	30.2
Total	7,377	2,201	29.8
EASTERN			
Kingston	3,451	773	22.4
Ottawa	2,243	670	29.9
Total	5,694	1,443	25.3
NORTHERN			
North Bay	1,127	432	38.3
Timmins	710	198	27.9
Sault Ste.Marie	692	117	17.0
Total	2,529	747	29.5
NORTHWESTERN			
Thunder Bay	779	72	9.2
Kenora	1,335	268	20.1
Total	2,114	340	16.1
GRAND TOTAL	43,908	13,984	31.8

Table 3.2.1 Empty Movement in Different Districts (M.T.C)

In Terms of Truck-kilometres x 100

LEVEL OF UTILIZATION	CARRIER TYPE FOR-HIRE	PRIVATE	TOTAL
	(- - - # / % of Tot.- - - -)		
Empty	13,900	20,680	34,580
	8.9	13.2	22.1
Quarter Full	3,630	5,580	9,210
	2.3	3.6	5.9
Half Full	5,590	5,730	11,320
	3.6	3.6	7.2
Three Quarter Full	6,610	6,700	13,310
	4.2	4.3	8.5
Full	45,810	39,340	85,150
	29.2	25.1	54.3
Don't Know	1,850	1,330	3,180
	1.2	0.8	2.0
Total	77,390	79,360	156,750
	49.4	50.6	100.0

Table 3.3.1 Utilization by Carrier Type

TRUCK TYPE

BODY TYPE	COUNT / ROW PCT / COL PCT / TOT PCT	1. STRAIGHT TRUCK	2. TRUCK & TRAILER	3. TRACTOR ONLY	4. TRACTOR &TRAILER	5. TRAILERS B-TRAIN	6. TRAILERS A-TRAIN	7. OTHER	ROW TOTAL
OTHER	0.	296	13	483	330	3	3	27	1155
		25.6	1.2	41.8	28.5	0.3	0.3	2.3	7.9
		7.9	2.4	100.0	3.7	0.9	1.1	18.7	
		2.0	0.1	3.3	2.3	0.0	0.0	0.2	
VAN	1.	1595	237	—	3354	35	55	11	5288
		30.2	4.5	—	63.4	0.7	1.0	0.2	36.3
		42.8	42.2	—	37.3	10.3	18.0	8.0	
		11.0	1.6	—	23.0	0.2	0.4	0.1	
TEMP CONTROLLED	2.	436	28	—	772	12	13	13	1273
		34.3	2.2	—	60.7	0.9	1.0	1.0	8.7
		11.7	4.9	—	8.6	3.5	4.2	8.9	
		3.0	0.2	—	5.3	0.1	0.1	0.1	
CONCRETE MIX	3.	53	—	—	5	—	—	—	59
		91.1	—	—	8.9	—	—	—	0.4
		1.4	—	—	0.1	—	—	—	
		0.4	—	—	0.0	—	—	—	
STAKE	4.	302	12	—	437	40	12	9	812
		37.2	1.4	—	53.8	4.9	1.5	1.1	5.6
		8.1	2.1	—	4.9	11.9	4.1	6.0	
		2.1	0.1	—	3.0	0.3	0.1	0.1	
DUMP	5.	571	66	—	847	26	155	3	1668
		34.2	4.0	—	50.7	1.6	9.3	0.2	11.5
		15.3	11.8	—	9.4	7.8	51.1	2.4	
		3.9	0.5	—	5.8	0.2	1.1	0.0	
TANKER	6.	152	76	—	1549	136	49	64	2027
		7.5	3.7	—	76.4	6.7	2.4	3.2	13.9
		4.1	13.5	—	17.2	40.7	16.2	44.9	
		1.0	0.5	—	10.6	0.9	0.3	0.4	
FLAT BED	7.	315	65	—	1321	60	13	16	1791
		17.6	3.6	—	73.8	3.3	0.7	0.9	12.3
		8.5	11.6	—	14.7	17.9	4.3	11.0	
		2.2	0.4	—	9.1	0.4	0.1	0.1	
CAR CARRIER	8.	8	57	—	321	20	3	—	409
		2.0	13.8	—	78.5	4.9	0.7	—	2.8
		0.2	10.0	—	3.6	6.0	1.0	—	
		0.1	0.4	—	2.2	0.1	0.0	—	
FLOAT	9.	—	9	—	66	3	—	—	78
		—	11.1	—	84.8	4.1	—	—	0.5
		—	1.5	—	0.7	0.9	—	—	
		—	0.1	—	0.5	0.0	—	—	
	COLUMN TOTAL	3729	562	483	9003	335	304	143	14559
		25.6	3.9	3.3	61.8	2.3	2.1	1.0	100.0

Table 3.4.1 / Distribution of Empty Trucks by Type and Body Type

TRUCK TYPE	Empty	1/4 Full	1/2 Full	3/4 Full	Full	Dont Know	Total
	LEVEL OF UTILIZATION						
	(- - -	- - - - - - #/Row % - - - - - - - - -)					Col %
Straight Trucks	3,729 35.7	1,903 18.2	1,094 10.5	872 8.3	2,698 25.8	161 1.5	10,457 22.8
Tractor only	580 100.0	-	-	-	-	-	580 1.3
Truck & Trailer	562 25.8	92 4.2	178 8.2	185 8.5	1,133 52.1	25 1.1	2,176 4.8
Tractor & Trailer	9,000 29.6	1,851 6.1	1,990 6.5	2,440 8.0	14,645 48.1	501 1.6	30,427 66.4
Two Trailers B-Train	335 36.6	23 2.5	37 4.1	99 10.8	409 44.7	13 1.4	915 2.0
Two Trailers A-Train	304 36.5	29 3.5	67 8.0	65 7.7	357 42.8	13 1.5	834 1.8
Other	143 34.6	21 5.0	32 7.8	77 18.8	116 28.1	23 5.7	412 0.9
Total	14,556 31.8	3,918 8.6	3,398 7.4	3,739 8.2	19,307 42.2	736 1.6	45,803 100.0

Table 3.4.2 Incidence of Truck Movements by Type and Level of Utilization

BODY TYPE	Empty	1/4 Full	1/2 Full	3/4 Full	Full	Dont Know	Total
	(- - -	- - - - - -	#/Row	% - - - - - - -	- - - - - - -	- - -)	Col %
Van(No temp. control)	5,287 24.1	2,329 10.6	2,012 9.2	1,777 8.1	10,078 45.9	466 2.1	21,948 47.9
Van(Temp. controlled)	1,273 32.8	467 12.0	279 7.2	319 8.2	1,463 37.7	80 2.0	3,882 8.5
Concrete Mixer	59 47.8	5 4.3	3 2.3	7 6.0	40 32.6	9 7.0	122 0.3
Stake	812 31.7	300 11.7	191 7.5	203 7.9	1,039 40.6	15 0.6	2,560 5.6
Dump	1,668 43.7	160 4.2	215 5.6	368 9.6	1,384 36.2	24 0.6	3,820 8.3
Tanker	2,027 49.3	53 1.3	225 5.5	514 12.5	1,267 30.8	28 0.7	4,114 9.0
Car Carrier	409 31.8	26 2.0	19 1.5	20 1.6	801 62.3	10 0.8	1,285 2.8
Flat Bed	1,791 33.4	371 6.9	322 6.0	304 5.7	2,501 46.7	70 1.3	5,358 11.7
Float	78 24.8	13 4.2	12 3.8	39 12.4	171 54.7	- 0.0	312 0.7
Other	1,155 48.0	193 8.0	120 5.0	202 8.4	693 28.8	43 1.8	2,406 5.3
Total	14,558 31.8	3.918 8.6	3,398 7.4	3,754 8.2	19,435 42.4	744 1.6	45,807 100.0

LEVEL OF UTILIZATION

Table 3.4.3 Incidence of Truck Movements by Bodytype and Level of Utilization

DISTANCE CLASSES (km)	TRUCKS Empty	Fully Loaded	Total
	(- - - #/Col % - -)		Col %
1- 24.9	448	334	1,100
	3.1	1.7	2.4
25.0- 49.9	1,082	808	2,742
	7.4	4.2	6.0
50.0- 74.9	1,509	1,041	3,511
	10.4	5.4	7.7
75.0- 99.9	1,621	1,062	4,073
	11.1	5.5	8.9
100.0-149.9	2,689	2,651	7,656
	18.5	13.6	16.7
150.0-199.9	1,551	2,333	5,173
	10.7	12.0	11.3
200.0-249.9	1,173	1,490	3,375
	8.1	7.7	7.4
250.0-299.9	649	1,014	2,240
	4.5	5.2	4.9
300.0-399.9	1,292	2,425	4,681
	8.9	12.5	10.2
400.0-499.9	617	1,329	2,492
	4.2	6.8	5.4
500.0-749.9	856	2,276	3,971
	5.9	11.7	8.7
750.0-999.9	382	969	1,701
	2.6	5.0	3.7
1000 -over	324	1,580	2,464
	2.2	8.1	5.4
Total	14,559	19,440	45,813
	100.0	100.0	100.0

Table 3.5.1 Distribution by Distance Intervals for Empty and Loaded Trucks

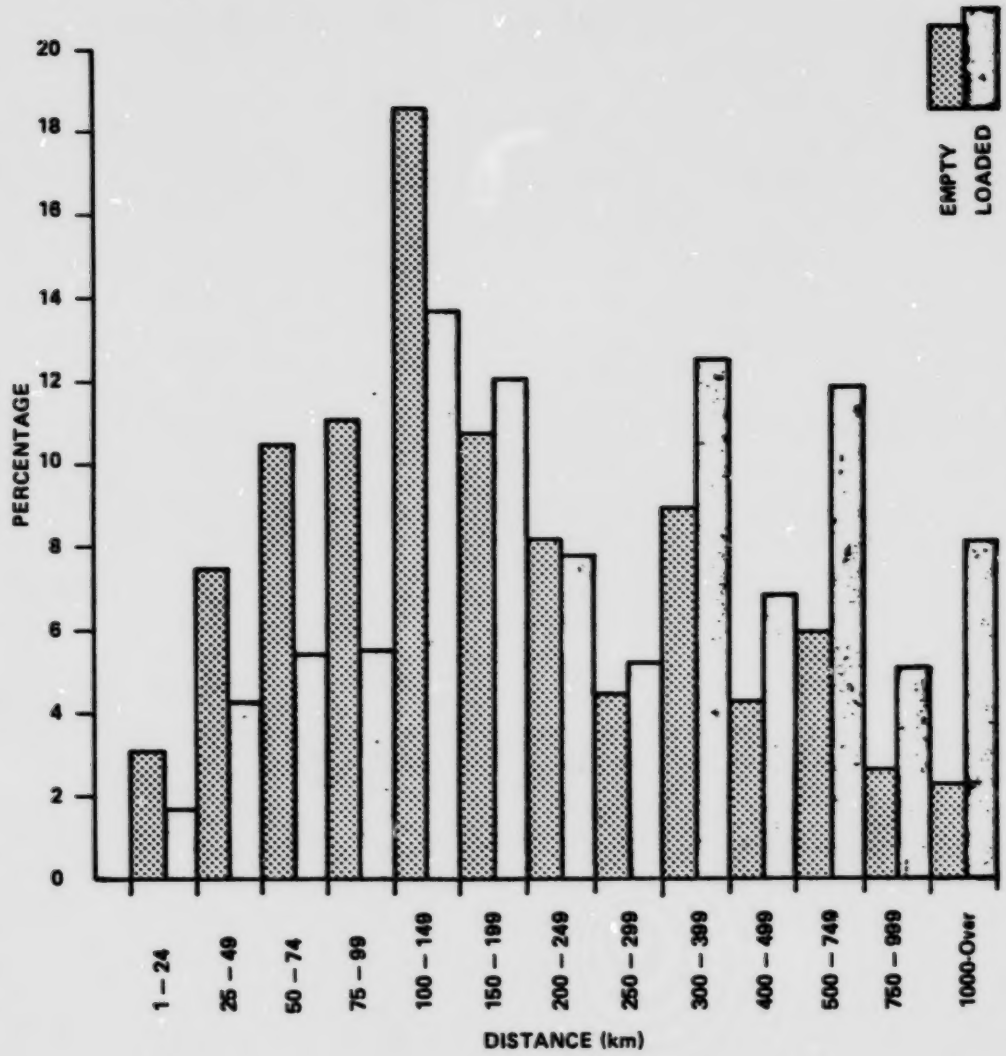

Figure 3.5.1/ Distribution by Distance Intervals for Empty and Loaded Trucks

ORIGIN-DESTIN.	Empty	LEVEL OF UTILIZATION 1/4 Full	1/2 Full	3/4 Full	Full	Dont Know	Total
	(-	- - - - - - - -	#/Row %	- - - - - - - -	- - - - - - - -	- - - - - - - -)	Col %
Ontario - Ontario	35.7	10.1	7.8	8.3	36.7	1.4	31,836 69.9
Ontario - U.S.A	16.1	5.1	7.0	7.4	62.8	1.6	3,588 7.8
U.S.A - Ontario	37.7	5.3	5.6	5.5	44.6	1.3	3,278 7.2
Ontario - Western.	9.6	3.4	5.7	11.3	66.7	3.3	741 1.6
Western.- Ontario	10.7	5.9	8.3	12.1	60.1	2.9	579 1.3
Ontario - Quebec	17.1	4.8	5.0	9.2	61.4	2.5	2,281 5.0
Quebec - Ontario	25.0	5.4	8.5	9.6	49.1	2.4	1,682 3.7
Ontario - Atlantic	16.3	4.3	5.2	19.0	52.6	2.6	116 0.3
Atlantic- Ontario	30.3	4.1	5.5	4.1	53.1	2.9	145 0.3
In-transit	13.8	4.9	8.6	7.4	62.8	2.5	1,296 2.8
Incomplete							258
TOTAL							45,800

Table 3.6.1 Incidence of Empty, Partially Empty and Fully Loaded Movements between Provinces/States

In Terms of Truck Movements

ORIGIN	DESTINATION: Western Provinces	Ontario	Quebec	Atlantic Provinces	U S A	TOTAL
Western Provinces	-	62 0.4	2	-	-	64 0.4
Ontario	71 0.5	11,357 78.0	391 2.7	19 0.1	577 4.0	12,415 85.4
Quebec	-	420 2.9	21 0.1	-	20 0.1	461 3.2
Atlantic Provinces	-	44 0.3	-	-	9 0.1	53 0.4
U S A	10 0.1	1,237 8.5	46 0.3	1	70 0.5	1,364 9.4
T O T A L	81 0.6	13,120 90.2	460 3.3	20 0.1	676 4.9	14,357 100.0

Table 3.6.2 Inter-regional Truck Travel Matrix for the Empty Movement

DEVICE TYPE	EMPTY MOVEMENT %	POPULATION %
Air Deflectors Only	9.8	14.3
Bubble Devices Only	6.1	7.4
Air Deflectors and Bubble Device	0.2	0.6
TOTAL	16.1	22.3

Table 3.7.1 Incidence of Energy Saving Devices on Trucks Running Empty.

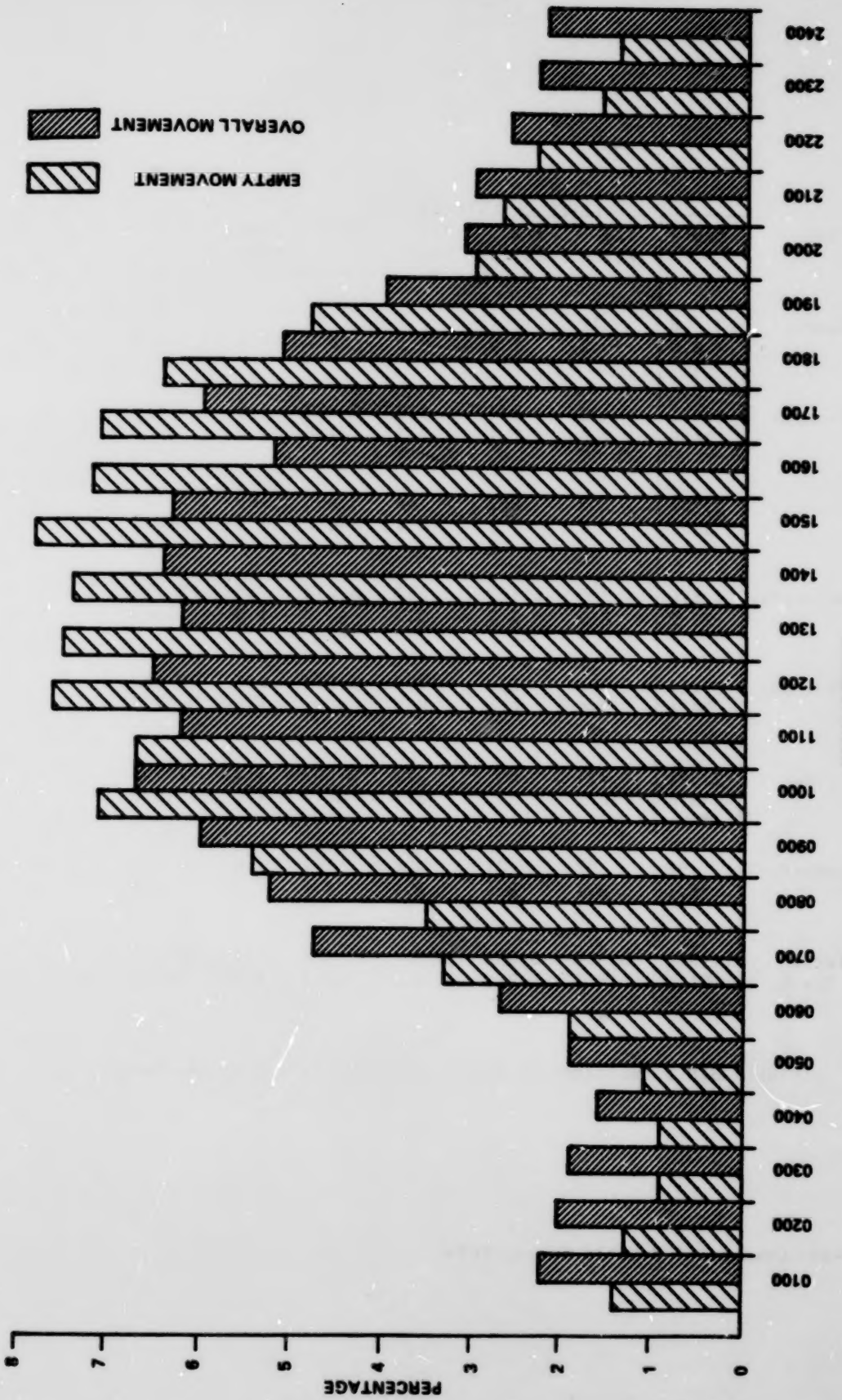

Figure 3.8.1 / Distribution of Empty Movements in Comparison with All Movements

DAY	Empty	LEVEL OF UTILIZATION 1/4 Full	1/2 Full	3/4 Full	Full	Dont Know	Total
	(- - -	- - - - - -	# / Row %	- - - - - -	- - - - - -	- - -)	Col %
Sunday	8	12	1	1	94	0	116
	6.9	10.3	1.2	0.9	80.7	0.0	0.3
Monday	2,015	438	414	423	2,423	110	5,822
	34.6	7.5	7.1	7.3	41.6	1.9	12.7
Tuesday	3,207	702	667	764	3,665	106	9,111
	35.2	7.7	7.3	8.4	40.2	1.2	19.9
Wednesday	4,586	1,320	1,162	1,247	6,574	286	15,175
	30.2	8.7	7.7	8.2	43.3	1.9	33.1
Thursday	2,124	694	556	720	3,914	125	8,133
	26.1	8.5	6.8	8.8	48.1	1.5	17.8
Friday	2,521	724	567	572	2,607	112	7,103
	35.5	10.2	8.0	8.1	36.7	1.6	15.5
Saturday	98	29	31	26	161	4	350
	28.1	8.4	8.8	7.4	46.1	1.3	0.8
Total	14,559	3,918	3,398	3,754	19,438	744	45,811
Row %	31.8	8.6	7.4	8.2	42.4	1.6	100.0

Table 3.8.1 Incidence of Empty Movements by Day of the Week

IS THE TRUCK LEASED?	Empty	1/4 Full	1/2 Full	3/4 Full	Full	Dont Know	TOTAL
	LEVEL OF UTILIZATION						
	(- - -	- - - - - -	# / Row %	- - - - - -	- - - - - -	- - -)	Col %
YES	2,595	887	782	741	4,029	183	9,218
	28.2	9.6	8.5	8.0	43.7	2.0	20.1
NO	11,638	2,966	2,528	2,903	14,861	523	35,420
	32.9	8.4	7.1	8.2	42.0	1.5	77.3
NO DATA	322	65	88	109	542	38	1,164
	27.7	5.6	7.5	9.4	46.6	3.3	2.5
TOTAL	14,555	3,918	3,398	3,754	19,433	744	45,802
	31.8	8.6	7.4	8.2	42.4	1.6	100.0

Table 3.9.1 Incidence of Empty Runs Among Leased Vehicles

BODY TYPES	FOR-HIRE	PRIVATE	TOTAL
Van(No temp.control)	242 9.3	940 36.2	1,181 45.5
Van(Temp. controlled)	25 1.0	286 11.1	312 12.1
Concrete Mixer	-	-	-
Stake	32 1.2	83 3.2	115 4.4
Dump	32 1.2	59 2.3	91 3.5
Tanker	57 2.2	250 9.6	306 11.8
Car Carrier	33 1.3	14 0.6	47 1.9
Flat Bed	95 3.7	224 8.6	319 12.3
Float	8 0.3	-	8 0.3
Other	54 2.1	160 6.2	214 8.3
Total	577 22.2	2,018 77.8	2,595 100.0

Table 3.9.2 Distribution of Body Types(Leased Trucks) by Carrier Category

4.0 DANGEROUS GOODS MOVEMENT

4.1 CLASSES OF DANGEROUS GOODS

The following general commodity groups are considered as dangerous goods and are shown against the respective classes.

Class	Dangerous Goods
1.	Explosives.
2.	Gases:- compressed, deeply refrigerated, liquefied or dissolved under pressure.
3.	Flammable and combustible liquids.
4.	Flammable solids:- substances liable to spontaneous combustion, substances when on contact with water emit flammable gases.
5.	Oxidizing substances:-organic peroxides, fertilizers.
6.	Poisonous and infectious substances:- pesticides, herbicides,fumigants, dyes.
7.	Radioactive materials.
8.	Corrosive substances:- causing severe damage to living tissue.
9.	Miscellaneous goods:- dangerous to life, health or environment.

Common examples for each class of dangerous good are listed in Appendix J.

Where relevant results are presented according to the nine dangerous goods classes, in terms of movements and tonnage (tonne), since these two variables are not necessarily proportionate.

Table 4.1.1 gives the distribution of dangerous goods among the nine broad classes. Flammable liquids (63%) are the most frequently carried dangerous goods followed by gases (12.6%) and corrosive substances (6.8%).

4.2 DANGEROUS GOODS MOVEMENT COMPONENT

The percent of trips engaged in the carriage of dangerous goods vary from station to station. However, the overall figure for the survey was 8.1% of all truck movements and in terms of tonnage they comprise 12.3% of all goods movements.

The variation in the percent trips connected with the carriage of dangerous goods across the different travel corridors is depicted in

Figures 4.2.1-4.2.2 Individual figures for the different survey locations are given in the composite Table 3.1.1 under the column heading "Dangerous".

The aggregate figures for the different M.T.C. Districts and Regions are given in Table 4.2.1. Hamilton District seems to record the highest incidence (11.1%) of dangerous goods movement. This is partly due to the above average incidence of dangerous goods movement through the two stations at Winona (11.8%) and Fruitland (14.2%) located on the Queen Elizabeth Way between Hamilton and Niagara Falls. A survey station in proximity to Sarnia had the highest incidence (21%) of dangerous goods movement, mainly due to the petroleum refinery activity going on in Sarnia.

4.3 CHARACTERISTICS OF TRUCKS CARRYING DANGEROUS GOODS

A cross-tabulation of truck types by body types of trucks engaged in the movement of dangerous goods is shown in Table 4.3.1.

The distribution of truck types and body types are slightly different from the distribution seen for the population. Incidence of tractors with two-trailers are more than twice as frequent as for the population and straight trucks are used less frequently for the carriage of dangerous goods. As for body types tankers(57%) predominate followed by vans (31.5%). Nearly 39% of trucks carrying dangerous goods are tractor-trailer tankers and over 8.5% of the trucks are tractors with two tanker trailers.

4.4 DISPLAY OF PLACARDS

A truck displaying any of the symbols shown in Appendix K or any external sign indicating the hazardous nature of the commodity being transported was recorded as displaying a placard.

On average 36% of vehicles carrying dangerous goods were reported as displaying warning placards. Table 4.4.1 shows the incidence of warning signs or placards being displayed on trucks of different body types engaged in the movement of dangerous goods. It is encouraging to note that about 50% of the tankers, mostly carrying flammable liquids, displayed warning signs.

Table 4.4.2 shows a cross-tabulation of class of dangerous goods carried against the incidence of warning signs or placards being displayed on trucks carrying them.

Over 40% of trucks carrying explosives, gases(all forms), poisonous substances, radioactive materials and corrosive substances displayed placards and thus did better than average. On the other hand only a third of the trucks carrying flammable liquids displayed any placards or warning signs.

4.5 ORIGIN - DESTINATION OF DANGEROUS GOODS

The aggregate movement of dangerous goods in the three most frequently carried classes i.e flammable and combustible liquids, gases and corrosive substances is discussed below. The results are tabulated as relative proportions of each dangerous goods' class total both in terms of movements and tonnage.

Table 4.5.1 shows that apart from the intra-provincial movement of flammable and combustible liquids the other major trip ends are the New York State and the Province of Quebec.

As for gases (under all conditions) the same pattern of trip interactions are noted as shown in Table 4.5.2.

In the case of corrosive substances Table 4.5.3 shows that though the degree of interaction between New York and Quebec with Ontario is comparatively less the incidence of in-transit movements of corrosive substances is more than that for the other two groups.

An overall picture of the dangerous goods movement is shown in Table 4.5.4. The intra-provincial movement of dangerous goods amounts to about 60% of the total in terms of both movements and tonnage.

In terms of

MOVEMENT TYPE	MOVEMENTS		TONNAGE(tonne)	
	#	%	#	%
Intra-provincial	2,346	62.9	33,445	60.4
International	792	21.3	12,605	22.8
Inter-provincial	489	13.1	7,437	13.4
In-transit	74	2.0	1,434	2.5
TOTAL	3,701	99.3	54,920	99.3

4.6 REGISTERED GROSS VEHICLE WEIGHT

Table 4.6.1 shows the frequency distributions of R G V W of trucks transporting dangerous goods by carrier type.

In almost all weight classes, except in the 50,000 - 55,000 kg range private carriers have a larger share of the movement in each weight class. Comparing with the distribution of R G V W for the entire population in Table 2.1.8 a distinct bias towards the use of heavier vehicles in the carriage of dangerous goods is noted.

Frequency distributions of R G V W for the two carrier types gave the following results.

CARRIER	MEAN kg	MEDIAN kg	MODE kg	CASES #
For-hire	49,000	51,800	63,500	1,321
Private	41,300	41,000	36,360	2,361
Overall	44,050	46,000	36,400	3,682

Comparing these figures with those for the population it is noted that generally heavier than average trucks are utilised in the transportation of dangerous goods. The R G V W of half the trucks is over 46,000 kg.

Frequency distributions of the actual gross vehicle weights for the two carrier types show the results outlined below.

CARRIER	MEAN kg	MEDIAN kg	MODE kg	CASES #
For-hire	33,460	33,950	35,500	1,238
Private	29,780	28,100	33,100	2,115
Overall	31,140	31,400	35,500	3,353

It is noted that the mean actual gross vehicle weight for the trucks engaged in the dangerous goods movement is about 70% of the mean R.G.V.W.

4.7 ESTABLISHMENT TYPE AT ORIGIN AND DESTINATION

The type of establishment from which dangerous goods originate and destined to is shown in Table 4.7.1.

As expected, a high proportion (44%) of all dangerous goods movement originate from manufacturing organizations and from warehouses (13%). The destination for most dangerous goods are manufacturing establishments (28%), warehouses (16%), retail ontlets (15%) and distribution centres (13%).

4.8 REGISTRATION OF VEHICLES CARRYING DANGEROUS GOODS

Table 4.8.1 shows the distribution of trucks carrying dangerous goods by Province/State of registration. Quite naturally, Ontario is the province of registration for the highest percentage (78%) of trucks carrying dangerous goods, with New York (7.8%) and Quebec (5.8%) ranking second and third. A slight shift in the distribution patterns are noted in that a higher proportion of trucks registered in Quebec and the U S are engaged in the movement of dangerous goods when compared with the overall movement.

4.9 COMMODITY WEIGHT

Table 4.9.1 show a cross-tabulation of commodity weight classes by industry segment. As noted previously the private carriers have a larger share of the dangerous goods movement.

Frequency distributions of commodity weight carried for the two industry segments gave the following results.

CARRIER	MEAN kg	MEDIAN kg	MODE kg	CASES #
For-hire	21,300	20,540	**	1,095
Private	18,100	18,000	19,110	1,769
Overall	19,320	18,940	18,180	2,864

** No significant mode value

The average weight of commodity carried by the for-hire carriers is about 18% more than that of the private carriers. Half the consignments carried by for-hire carriers is over 20,540 kg, whereas for the private carriers the comparable figure is 18,000 kg.

4.10 TYPE OF CARRIER ENGAGED IN CARRYING DANGEROUS GOODS

Table 4.10.1 indicate the proportion of carriers engaged in carrying dangerous goods both in terms of truck movements and tonnages.

Private carriers appear to share more than 64% of all dangerous goods movements and in terms of tonnage they have 58% of the market. Although the private carriers have a larger share of the movements for all classes of dangerous goods except poisonous and radioactive substances, in terms of weight of dangerous goods moved for-hire carriers have a larger share of the movement of corrosive substances, poisonous and radioactive material and explosives.

4.11 CARRIAGE OF DANGEROUS GOODS IN LEASED VEHICLES.

About 24% of the trucks carrying dangerous goods are reported leased. This statistic is slightly higher than that for the population (20%).

Table 4.11.1 shows the lease/rental periods for trucks carrying dangerous goods. Nearly 18% of the drivers of leased vehicles engaged in the carriage of dangerous goods were reluctant to offer information about the duration of leases. For the population the comparable figure is 23%. About 45% of the leased/rented trucks are reported to be leased/rented for periods between 3 - 5 years.

4.12 TRIP LENGTH

Figure 4.12.1 illustrates the distribution of truck trips by distance classes for the two carrier types.

The private carriers have a larger share of the short trips i.e 57% of all trips made by the private carriers are less than 200km. The opposite is true of the for-hire carriers in that 57% of all trips made by them are over 200km.

Frequency distributions of truck trip lengths for the two industry segments gave the following results.

CARRIER	MEAN km	MEDIAN km	MODE km	CASES #
For-hire	380	242	93	1,326
Private	310	154	154	2,356
Overall	335	186	146	3,682

Trips over 1000 km(625 miles) were 5.0% of all dangerous goods movements. The average trip length for for-hire carriers about 20% more than that for the private carriers. The average length of dangerous goods trips is about the same as that of the population.

CLASS	FREQUENCY #	PERCENT %
1.Explosives	72	1.9
2.Gases(compressed)	471	12.6
3.Flammable and Combustible Liquids	2,345	62.9
4.Flammable Solids	139	3.7
5.Oxidizing Agents	114	3.1
6.Poisonous and Infectious Material	46	1.2
7.Radioactive	17	0.5
8.Corrosive Substances	254	6.8
9.Miscellaneous Goods	272	7.3
Total	3,730	100.0

Table 4.1.1 Distribution of Dangerous Goods by Class

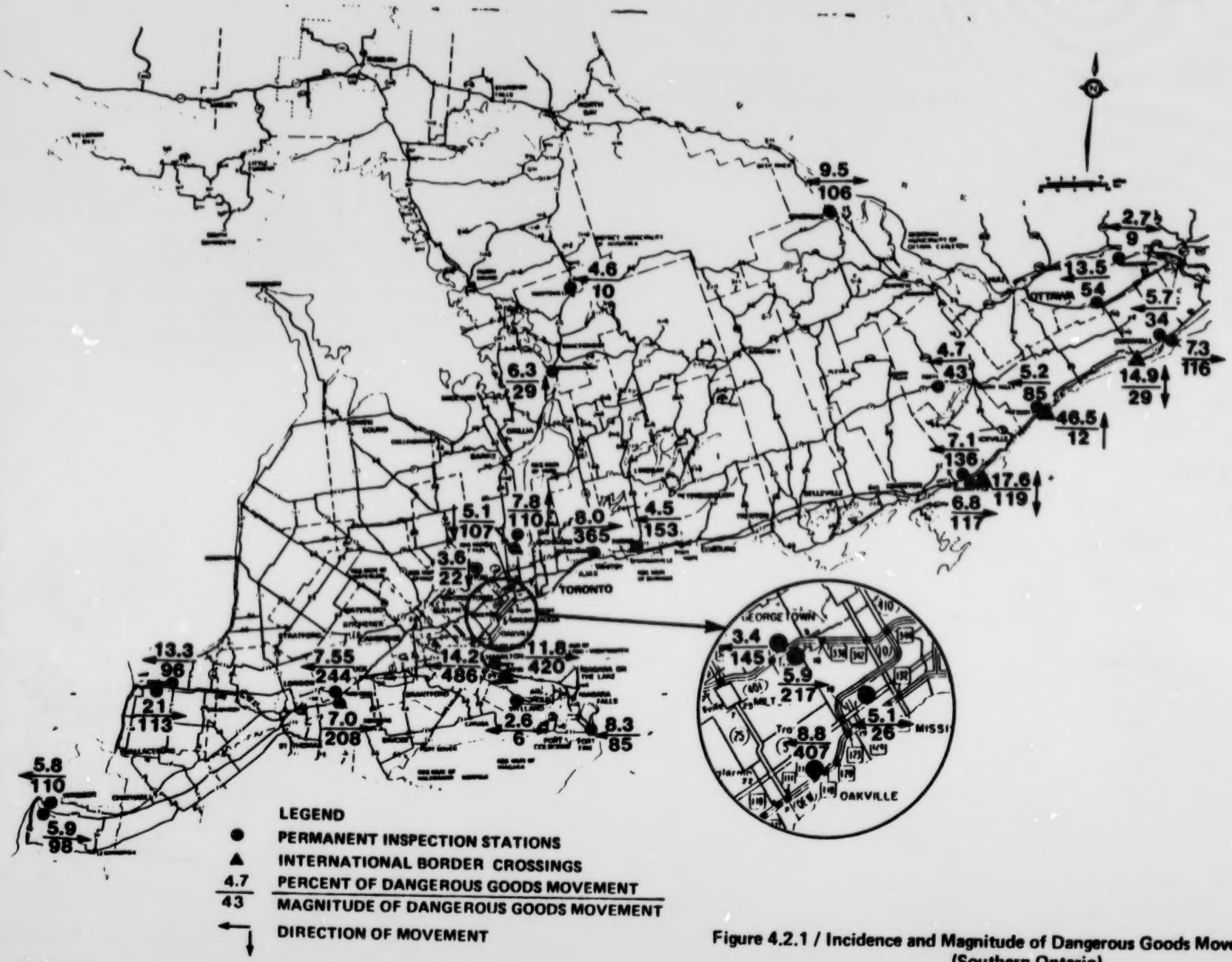

Figure 4.2.1 / Incidence and Magnitude of Dangerous Goods Movement (Southern Ontario)

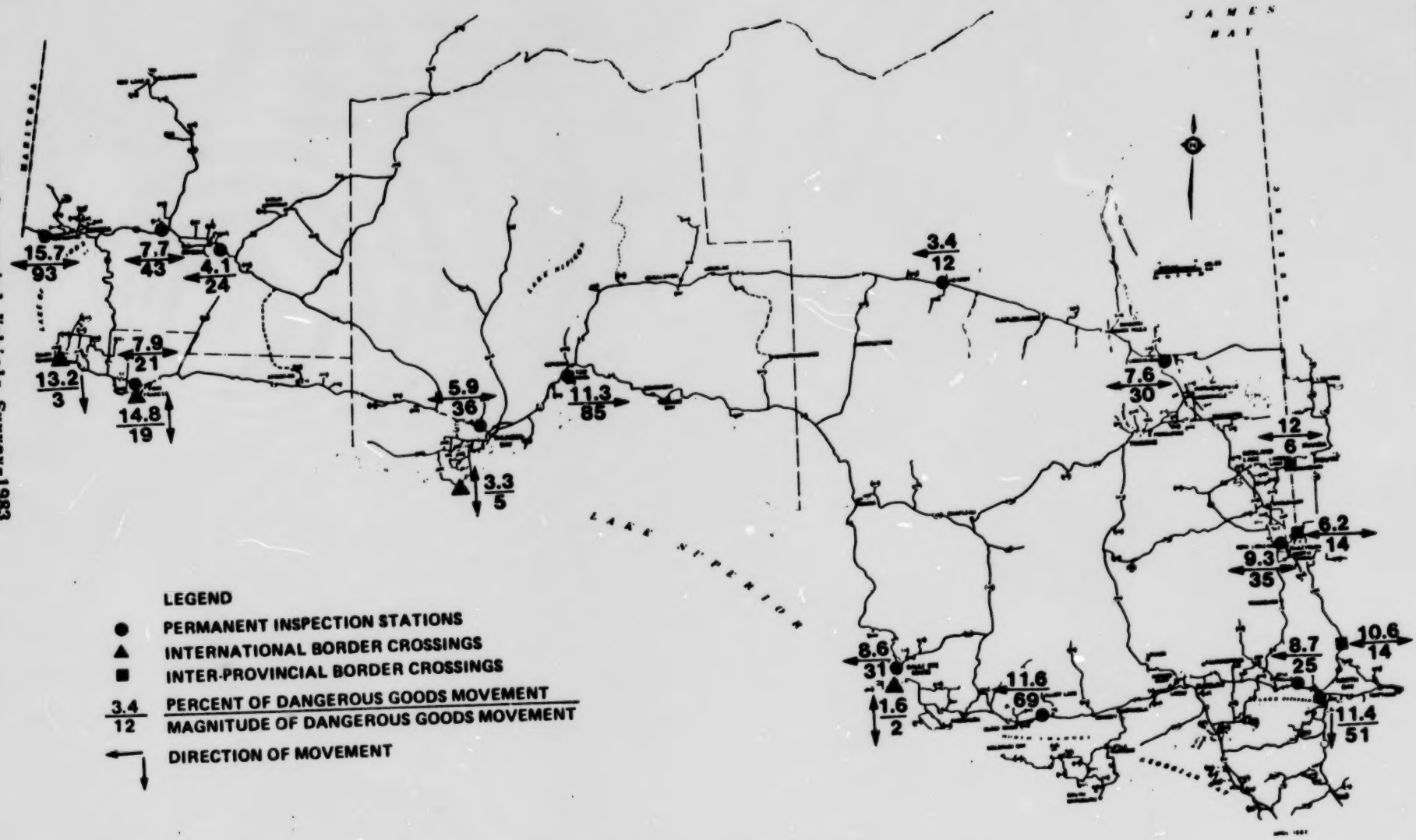

Figure 4.2.2 / Incidence and Magnitude of Dangerous Goods Movement
(Northern Ontario)

REGION District	TOTAL MOVEMENTS	TOTAL DANGEROUS	PERCENT DANGEROUS
CENTRAL			
Toronto East	8,395	565	6.7
Toronto West	7,216	330	4.6
Hamilton	10,583	1,174	11.1
Total	26,194	2,069	7.9
SOUTHWESTERN			
London	3,990	296	7.4
Windsor	3,387	301	8.9
Total	7,377	597	8.1
EASTERN			
Kingston	3,451	235	6.8
Ottawa	2,243	177	7.9
Total	5,694	412	7.2
NORTHERN			
North Bay	1,127	99	8.7
Timmins	710	50	7.0
Sault Ste.Marie	692	75	10.8
Total	2,529	224	8.8
NORTHWESTERN			
Thunder Bay	779	74	9.4
Kenora	1,335	120	9.0
Total	2,114	194	9.2
GRAND TOTAL	43,908	3,494	8.0

Table 4.2.1 Dangerous Goods Movement in Different M.T.C. Districts and Regions

TRUCK TYPE

BODY TYPE	Straight Truck	Truck & Trailer	Tractor Trailer	Two-Trailers B-train	Two-Trailers A-train	Other	Total Col %
	(- - - - - - - - # / % of Tot. - - - - - - -)						
Van(No temp. control)	230 6.2	33 0.9	833 22.3	13 0.4	7 0.2	-	1,117 29.9
Van(Temp. controlled)	17 0.4	1 0.0	41 1.1	-	-	-	59 1.6
Concrete Mixer	1 0.0	-	-	-	-	-	1 0.0
Stake	23 0.6	1 0.0	19 0.5	10 0.3	3 0.1	-	56 1.5
Dump	55 1.5	5 0.1	51 1.4	12 0.3	23 0.6	-	146 3.9
Tanker	172 4.6	82 2.2	1,453 39.0	216 5.8	100 2.7	91 2.4	2,115 56.7
Flat Bed	12 0.3	20 0.5	32 0.9	8 0.2	-	-	72 1.9
Float	-	-	2 0.1	-	-	18 0.5	20 0.6
Other	66 1.8	8 0.2	64 1.7	5 0.1	-	1 0.0	143 3.8
Total	575 15.4	151 4.1	2,496 66.9	264 7.1	133 3.6	111 3.0	3,730 100.0

Table 4.3.1 Distribution of Body Types by Truck Type for the Dangerous Goods Movement

BODY TYPE	PLACARDS #	% OF TOTAL	TOTAL #
1.Van(No temp.control)	202	18.1	1,117
2.Van(Temp.controlled)	2	4.0	59
3.Concrete Mixer	-	-	1
4.Stake	5	9.0	56
5.Dump	15	10.2	146
6.Tanker	1,040	49.2	2,115
7.Flat Bed	26	35.9	72
8.Car Carrier	-	-	-
9.Float	0	0.0	20
10.Other	39	27.0	143
Total	1,329	35.6	3,730

Table 4.4.1 Incidence of Warning Signs/Placards by Body Type

CLASS	PLACARDS #	% OF TOTAL	TOTAL #
1.Explosives	29	40.0	72
2.Gases(compressed)	196	41.5	471
3.Flammable and Combustible Liquids	783	33.4	2,345
4.Flammable Solids	23	16.5	139
5.Oxidizing Agents	37	31.9	114
6.Poisonous and Infectious Material	21	47.0	46
7.Radioactive	12	72.7	17
8.Corrosive Substances	155	60.9	254
9.Miscellaneous Goods	73	27.0	272
Total	1,329	35.6	3,730

Table 4.4.2 Incidence of Warning Signs/Placards by Class of Dangerous Goods

DESTINATION

ORIGIN	COUNT / ROW PCT / COL PCT / TOT PCT	0.1	1.1	2.1	3.1	4.1	6.1	7.1	9.1	11.1	12. MICHIGAN	13. MINNESOTA	14. PENNSYLVANIA	16. OTHER STATES	ROW TOTAL
ONTARIO	0.	0	0	0	0	0	0	17	0	0	0	0	0	0	17
		0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
		0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	
		0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	
ALBERTA	1.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
B.C.	2.	0	0	0	0	0	0	2	0	0	0	0	0	0	2
		0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
		0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	
		0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	
MANITOBA	3.	0	0	0	0	0	0	41	0	0	0	0	0	0	41
		0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8
		0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	
		0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	
ONTARIO	7.	3	2	2	12	3	1	1474	175	200	12	13	11	50	1950
		0.2	0.1	0.1	0.6	0.1	0.1	75.3	8.9	10.2	0.6	0.6	0.6	2.6	83.5
		100.0	76.6	100.0	80.4	100.0	100.0	79.9	96.1	97.6	92.6	100.0	100.0	90.3	
		0.1	0.1	0.1	0.5	0.1	0.0	62.9	7.4	8.5	0.5	0.5	0.5	2.2	
QUEBEC	9.	0	0	0	2	0	0	85	1	3	0	0	0	1	92
		0.0	0.5	0.0	1.7	0.0	0.0	92.1	1.0	3.6	0.0	0.0	0.0	1.0	3.9
		0.0	23.2	0.0	11.6	0.0	0.0	4.6	0.5	1.6	0.0	0.0	0.0	1.7	
		0.0	0.0	0.0	0.1	0.0	0.0	3.6	0.0	0.1	0.0	0.0	0.0	0.0	
NEW YORK	11.	0	0	0	0	0	0	111	4	0	1	0	0	0	116
		0.0	0.0	0.0	0.0	0.0	0.0	95.6	3.5	0.0	0.9	0.0	0.0	0.0	4.9
		0.0	0.0	0.0	0.0	0.0	0.0	6.0	2.2	0.0	7.6	0.0	0.0	0.0	
		0.0	0.0	0.0	0.0	0.0	0.0	4.7	0.2	0.0	0.0	0.0	0.0	0.0	
MICHIGAN	12.	0	0	0	0	0	0	7	0	2	0	0	0	0	9
		0.0	0.0	0.0	0.0	0.0	0.0	77.5	0.0	22.5	0.0	0.0	0.0	0.0	0.4
		0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	1.0	0.0	0.0	0.0	0.0	
		0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.0	
MINNESOTA	13.	0	0	0	0	0	0	1	0	0	0	0	0	0	1
		0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
		0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	
		0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	
PENNSYLVANIA	14.	0	0	0	0	0	0	5	0	0	0	0	0	0	5
		0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
		0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	
		0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	
OHIO	15.	0	0	0	0	0	0	4	0	0	0	0	0	0	5
		0.0	0.0	0.0	0.0	0.0	0.0	91.5	0.5	0.0	0.0	0.0	0.0	0.0	0.2
		0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	
		0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	
OTHER STATES	16.	0	0	0	0	0	0	98	2	0	0	0	0	0	99
		0.0	0.0	0.0	0.0	0.0	0.0	98.5	1.7	0.0	0.0	0.0	0.0	0.0	4.2
		0.0	0.0	0.0	0.0	0.0	0.0	5.3	0.9	0.0	0.0	0.0	0.0	0.0	
		0.0	0.0	0.0	0.0	0.0	0.0	4.2	0.1	0.0	0.0	0.0	0.0	0.0	
COLUMN TOTAL		3	2	2	14	3	1	1845	182	205	13	13	11	51	2345
		0.1	0.1	0.1	0.6	0.1	0.0	78.7	7.7	8.8	0.6	0.5	0.5	2.2	100.0

(CONTINUED)

Table 4.5.1 / Movement of Flammable and Combustible Liquids between Provinces and some States

DESTINATION

ORIGIN (ORIGPROV)	COUNT / ROW PCT / COL PCT / TOT PCT	ALBERTA 1.	B.C. 2.	MANITOBA 3.	NFLD. 5.	ONTARIO 7.	QUEBEC 9.	SASK. 10.	NEW YORK 11.	MICHIGAN 12.	OTHER STATES 14.	ROW TOTAL
	0.	0	0	0	0	9	0	0	0	0	0	9
		0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	2.0
		0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	
		0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	
B.C.	2.	0	0	0	0	2	0	0	0	0	0	2
		0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.5
		0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	
		0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	
MANITOBA	3.	0	0	0	0	3	0	0	0	0	0	3
		0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.6
		0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	
		0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	
ONTARIO	7.	0	6	3	5	307	32	4	9	34	4	403
		0.0	1.4	0.7	1.1	76.2	8.0	0.9	2.1	8.4	1.0	85.6
		0.0	100.0	100.0	100.0	82.4	100.0	100.0	79.3	100.0	100.0	
		0.0	1.2	0.6	1.0	65.2	6.8	0.8	1.8	7.2	0.9	
QUEBEC	9.	0	0	0	0	13	0	0	0	0	0	13
		2.3	0.0	0.0	0.0	97.7	0.0	0.0	0.0	0.0	0.0	2.7
		100.0	0.0	0.0	0.0	3.4	0.0	0.0	0.0	0.0	0.0	
		0.1	0.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	
NEW YORK	11.	0	0	0	0	26	0	0	0	0	0	26
		0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	5.4
		0.0	0.0	0.0	0.0	6.9	0.0	0.0	0.0	0.0	0.0	
		0.0	0.0	0.0	0.0	5.4	0.0	0.0	0.0	0.0	0.0	
MICHIGAN	12. A	0	0	0	0	0	0	0	2	0	0	2
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.5
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.7	0.0	0.0	
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	
PENNSYLVANIA	14.	0	0	0	0	3	0	0	0	0	0	3
		0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.6
		0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	
		0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	
OHIO	15.	0	0	0	0	1	0	0	0	0	0	1
		0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.3
		0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	
		0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	
OTHER STATES	16.	0	0	0	0	9	0	0	0	0	0	9
		0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	1.9
		0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	
		0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	
	COLUMN TOTAL	0 0.1	6 1.2	3 0.6	5 1.0	372 79.1	32 6.8	4 0.8	11 2.3	34 7.2	4 0.9	471 100.0

Table 4.5.2 / Movement of Gases (under all Conditions) between Provinces and some States

DESTINATION

ORIGIN	COUNT / ROW PCT / COL PCT / TOT PCT	B.C. 2.	ONTARIO 7.	QUEBEC 9.	NEW YORK 11.	MICHIGAN 13.	OTHER STATES 14.	ROW TOTAL
MANITOBA	3.		4 66.6 1.8 1.4				2 33.4 100.0 0.7	5 2.1
ONTARIO	7.	1 0.5 73.9 0.3	148 82.2 74.5 58.3	4 2.3 26.9 1.6	8 4.2 70.2 3.0	19 10.8 74.8 7.6		179 71.0
QUEBEC	9.	0 2.1 26.1 0.1	11 75.3 5.4 4.3		3 22.6 29.8 1.3			14 5.7
NEW YORK	11.		19 67.7 9.6 7.5	3 9.0 16.5 1.0		7 23.3 25.2 2.6		28 11.1
PENNSYLVANIA	12.		7 96.6 3.4 2.6	0 3.4 1.5 0.1				7 2.7
MICHIGAN	13.		4 30.5 1.9 1.5	8 69.5 55.1 3.3				12 4.8
OTHER STATES	14.		7 100.0 3.4 2.7					7 2.7
	COLUMN TOTAL	1 0.5	198 78.3	15 6.0	11 4.3	26 10.2	2 0.7	253 100.0

Table 4.5.3 / Movement of Corrosive Substances between Provinces and Some States

DESTINATION

ORIGIN (DESTPROV)		0.	1. ALBERTA	2. B.C.	3. MANITOBA	4. N.B.	5. NFLD	6. N.S.	7. ONTARIO	9. QUEBEC	10. SASK.	11. NEW YORK	12. MICHIGAN	13. MINNESOTA	14. PENNSYLVANIA	15. OHIO	16. OTHER STATES	ROW TOTAL
0.	COUNT	0	0	0	0	0	0	0	26	0	0	0	0	0	0	0	0	26
	ROW PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
	COL PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	TOT PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
1. ALBERTA	COUNT	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	5
	ROW PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	COL PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	TOT PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2. B.C.	COUNT	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	4
	ROW PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	COL PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	TOT PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
3. MANITOBA	COUNT	0	0	0	0	0	0	0	53	0	0	0	0	2	0	0	0	55
	ROW PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	96.4	0.0	0.0	0.0	0.0	3.6	0.0	0.0	0.0	1.5
	COL PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	10.5	0.0	0.0	0.0	
	TOT PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
7. ONTARIO	COUNT	3	5	11	19	3	5	1	2346	239	4	235	85	15	17	3	90	3082
	ROW PCT	0.1	0.2	0.3	0.6	0.1	0.2	0.0	76.1	7.7	0.1	7.6	2.8	0.5	0.6	0.1	2.9	87.6
	COL PCT	100.0	87.2	91.2	89.9	100.0	100.0	100.0	88.3	91.9	100.0	95.2	85.2	89.4	52.8	91.8	96.6	
	TOT PCT	0.1	0.1	0.3	0.5	0.1	0.1	0.0	62.9	6.4	0.1	6.3	2.3	0.4	0.5	0.1	2.4	
9. QUEBEC	COUNT	0	1	0	2	0	0	0	138	2	0	8	4	0	15	0	3	174
	ROW PCT	0.0	0.6	0.2	1.2	0.0	0.0	0.0	79.3	1.2	0.0	4.6	2.4	0.0	8.6	0.2	1.9	4.7
	COL PCT	0.0	12.8	7.6	10.1	0.0	0.0	0.0	5.7	0.8	0.0	3.1	4.2	0.0	47.2	9.0	3.4	
	TOT PCT	0.0	0.0	0.0	0.1	0.0	0.0	0.0	3.7	0.1	0.0	0.2	0.1	0.0	0.4	0.0	0.1	
10. SASK.	COUNT	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
	ROW PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	COL PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	TOT PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
11. NEW YORK	COUNT	0	0	1	0	0	0	0	174	0	0	0	9	0	0	0	0	191
	ROW PCT	0.0	0.0	0.4	0.0	0.0	0.0	0.0	90.8	4.0	0.0	0.0	4.6	0.0	0.0	0.0	0.0	5.1
	COL PCT	0.0	0.0	0.2	0.0	0.0	0.0	0.0	5.9	1.0	0.0	0.0	9.1	0.0	0.0	0.0	0.0	
	TOT PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	
12. MICHIGAN	COUNT	0	0	0	0	0	0	0	11	8	0	4	0	0	0	0	0	24
	ROW PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.4	34.0	0.0	17.0	0.0	0.0	0.0	0.0	0.0	0.6
	COL PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	3.2	0.0	1.7	0.0	0.0	0.0	0.0	0.0	
	TOT PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	
13. MINNESOTA	COUNT	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
	ROW PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	COL PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	TOT PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
14. PENNSYLVANIA	COUNT	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	20
	ROW PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	96.8	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
	COL PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	TOT PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
15. OHIO	COUNT	0	0	0	0	0	0	0	8	1	0	0	0	0	0	0	0	9
	ROW PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90.6	9.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
	COL PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	TOT PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
16. OTHER STATES	COUNT	0	0	0	0	0	0	0	132	2	0	0	2	0	0	0	0	136
	ROW PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	97.1	1.4	0.0	0.0	1.4	0.0	0.0	0.0	0.0	3.6
	COL PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5	0.9	0.0	0.0	1.5	0.0	0.0	0.0	0.0	
	TOT PCT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
COLUMN TOTAL	COUNT	3	6	12	22	3	5	1	2991	261	4	247	100	17	32	4	96	3750
	PCT	0.1	0.2	0.3	0.6	0.1	0.1	0.0	79.8	7.0	0.1	6.6	2.7	0.5	0.9	0.1	2.6	100.0

(CONTINUED)

Table 4.5.4/ Overall Movement of Dangerous Goods between Provinces and some States

R.G.V.W (kg.)	CARRIER TYPE For-hire	Private	Total
1- 2400	8	39	48
	0.2	1.1	1.3
2401- 5000	-	7	7
	-	0.2	0.2
5001-10000	12	39	51
	0.3	1.1	1.4
10001-15000	9	200	209
	0.3	5.2	5.5
15001-20000	14	126	130
	0.4	3.4	3.8
20001-25000	31	113	144
	0.8	3.1	3.9
25001-30000	41	79	120
	1.1	2.1	3.2
30001-35000	34	75	108
	0.9	2.0	2.9
35001-40000	239	458	697
	6.4	12.3	18.7
40001-45000	88	239	327
	2.4	6.4	8.8
45001-50000	144	213	357
	3.9	5.7	9.6
50001-55000	334	323	656
	8.9	8.7	17.6
55001-60000	146	154	300
	3.9	4.1	8.0
60001- over	228	336	565
	6.1	9.0	15.1
Total	1,329	2,401	3,730
	35.6	64.4	100.0

Table 4.6.1 Tabulation of R.G.V.W. by Carrier Type -Dangerous Goods Movement

ESTABLISHMENT AT DESTINATION

ESTABLISHMENT AT ORIGIN (ORIGESTA)	DONT KNO IN 0.	AIR 1.	RAIL 2.	MARINE 3.	TRUCK 4.	POINT OF SALE 5.	MANUFACTURER 6.	WAREHOUSE 7.	DISTRIBUTION 8.	OTHER 9.	ROW TOTAL
0. DONT KNOW	40	0	0	0	1	0	0	5	0	19	85
	70.6	0.0	0.0	0.0	1.3	0.0	0.0	6.3	0.0	21.7	2.3
	78.8	0.0	0.0	0.0	0.5	0.0	0.0	0.9	0.0	3.0	
	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.5	
1. AIR	0	2	0	0	2	0	0	0	0	6	10
	0.0	20.4	0.0	0.0	21.4	0.0	0.0	0.0	0.0	58.2	0.3
	0.0	17.9	0.0	0.0	0.9	0.0	0.0	0.0	0.0	1.0	
	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	
3. MARINE	0	0	0	0	1	0	0	0	2	0	4
	0.0	0.0	0.0	0.0	40.1	0.0	0.0	0.0	59.9	0.0	0.1
	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.4	0.0	
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	
4. TRUCK	0	0	0	5	73	29	127	23	44	28	329
	0.0	0.0	0.0	1.6	22.2	8.7	38.5	7.1	13.4	8.5	8.8
	0.0	0.0	0.0	22.1	30.9	4.9	11.8	3.9	9.0	4.6	
	0.0	0.0	0.0	0.1	2.0	0.8	3.4	0.6	1.2	0.7	
5. PRIMARY SOURCE	2	0	0	19	3	25	54	13	54	11	180
	1.2	0.0	0.0	10.4	1.4	14.0	30.1	7.1	29.9	5.9	4.8
	2.8	0.0	0.0	77.9	1.1	4.3	5.0	2.2	11.0	1.7	
	0.1	0.0	0.0	0.5	0.1	0.7	1.5	0.3	1.4	0.3	
6. MANUFACTURER	8	4	15	0	85	343	625	252	146	173	1651
	0.5	0.2	0.9	0.0	5.2	20.8	37.8	15.2	8.8	10.5	44.3
	10.5	33.1	100.0	0.0	35.9	58.0	58.0	42.1	29.9	28.3	
	0.2	0.1	0.4	0.0	2.3	9.2	16.7	6.7	3.9	4.7	
7. WAREHOUSE	3	0	0	0	12	74	56	210	38	83	476
	0.7	0.0	0.0	0.0	2.5	15.6	11.7	44.0	8.0	17.4	12.8
	4.5	0.0	0.0	0.0	5.0	12.6	5.2	35.1	7.8	13.5	
	0.1	0.0	0.0	0.0	0.3	2.0	1.5	5.6	1.0	2.2	
8. DISTRIBUTION	0	0	0	0	28	55	103	32	162	57	437
	0.0	0.0	0.0	0.0	6.4	12.5	23.6	7.4	37.0	13.0	11.7
	0.0	0.0	0.0	0.0	11.8	9.3	9.6	5.4	33.2	9.3	
	0.0	0.0	0.0	0.0	0.7	1.5	2.8	0.9	4.3	1.5	
9. OTHER	3	6	0	0	32	65	112	62	42	236	557
	0.5	1.0	0.0	0.0	5.7	11.6	20.1	11.1	7.6	42.4	14.9
	3.5	49.1	0.0	0.0	13.3	11.0	10.4	10.4	8.6	38.6	
	0.1	0.2	0.0	0.0	0.8	1.7	3.0	1.7	1.1	6.3	
COLUMN TOTAL	77	11	15	24	237	590	1076	597	488	613	3730
	2.1	0.3	0.4	0.6	6.4	15.8	28.9	16.0	13.1	16.4	100.0

Table 4.7.1 / Type of Establishment at Trip End for the Dangerous Goods Movements

PROVINCE/STATE	FOR-HIRE		PRIVATE		TOTAL	
	#	%	#	%	#	%
Alberta	4	0.1	9	0.2	13	0.3
British Columbia	18	0.5	0	0	18	0.5
Manitoba	34	0.9	27	0.7	61	1.6
Saskatchewan	1	0	4	0.1	5	0.1
Western Prov.	57	1.5	40	1.0	97	2.5
Newfoundland	-					
New Brunswick	-	-				
Nova Scotia	-	-	4	0.1	4	0.1
P.E.I.	-	-				
Atlantic Prov.	-	-	4	0.1	4	0.1
Quebec	57	1.5	158	4.2	215	5.8
Ontario	1,120	30.0	1,793	48.1	2,913	78.1
New York	45	1.2	238	6.6	284	7.8
Michigan	2	0.0	8	0.2	10	0.2
Pennsylvania	19	0.5	13	0.4	32	0.9
Missouri	0	0	18	0.5	18	0.5
Virginia	0	0	17	0.5	17	0.5
All States	79	2.2	342	9.2	421	11.4
Not known	16	0.4	64	1.8	80	2.2
Total	1,329	35.6	2,401	64.4	3,730	100.0

Table 4.8.1 Distribution of Trucks by Province/State of Registration (Dangerous Goods Movement)

COMMODITY WEIGHT(kg)	CARRIER TYPE For-hire	Private	Total
No data	234 6.3	631 16.9	865 23.2
1- 2400	81 2.2	242 6.5	323 8.7
2401- 5000	45 1.2	118 3.2	163 4.4
5001-10000	89 2.4	242 6.5	331 8.9
10001-15000	77 2.1	157 4.2	234 6.3
15001-20000	222 5.9	332 8.9	553 14.8
20001-25000	228 6.1	216 5.8	444 11.9
25001-30000	88 2.4	138 3.7	226 6.1
30001-35000	115 3.1	112 3.0	227 6.1
35001-40000	63 1.7	94 2.5	157 4.2
40001-45000	59 1.6	49 1.3	108 2.9
45001-50000	11 0.3	20 0.5	31 0.8
50001-55000	7 0.2	10 0.3	17 0.5
55001- over	10 0.3	38 1.0	48 1.3
Total	1,329 35.6	2,401 64.4	3,730 100.0

Table 4.9.1 Distribution of Commodity Weight Classes by Carrier Type - Dangerous Goods Movement

CLASS	FOR-HIRE (1)	FOR-HIRE (2)	PRIVATE (1)	PRIVATE (2)
1.Explosives	34	528	38	444
	0.9	1.0	1.0	0.8
2.Gases(compressed)	120	1,204	351	4,770
	3.2	2.2	9.4	8.6
3.Flammable and Combustible Liquids	825	14,227	1,520	19,212
	22.1	25.7	40.7	34.7
4.Flammable Solids	62	1,519	78	1,898
	1.7	2.7	2.1	3.4
5.Oxidizing Agents	35	776	80	1,389
	0.9	1.4	2.1	2.5
6.Poisonous and Infectious Material	27	715	18	292
	0.7	1.3	0.5	0.5
7.Radioactive	12	205	5	121
	0.3	0.4	0.1	0.2
8.Corrosive Substances	127	3,166	128	2,156
	3.4	5.7	3.4	3.9
9.Miscellaneous Goods	88	984	184	1,742
	2.3	1.8	4.9	3.1
Total	1,329	23,324	2,401	32,024
	35.6	42.1	64.4	57.9

Table 4.10.1 Mix of Carriers Carrying Dangerous Goods by Class

Note (1) In terms of movements.
(2) In terms of tonnes (1 tonne = 1000 kg)

Units	Days	Weeks	Months	Years
0	6 0.7	-	-	151 17.1
1	33 3.7	2 0.3	15 1.7	42 4.8
2	8 0.9	-	-	24 2.7
3	12 1.3	-	7 0.8	96 10.9
4	9 1.0	-	2 0.3	67 7.6
5	10 1.1	21 2.3	18 2.0	223 25.3
6	-	-	6 0.7	-
7	-	-	-	1 0.1
9	-	3 0.4	3 0.4	98 11.1
10	-	-	-	18 2.0
11	-	-	3 0.3	- -
18	-	-	1 0.2	- -

Table 4.11.1 Duration of Rent/Lease Arrangements for Trucks carrying Dangerous Goods.

DISTANCE CLASSES (km)	CARRIER TYPE For-hire	Private	Total
1- 24.9	15 0.4	40 1.1	54 1.5
25.0- 49.9	69 1.8	145 3.9	214 5.7
50.0- 74.9	22 0.6	230 6.1	252 6.7
75.0- 99.9	93 2.5	213 5.7	306 8.2
100.0-149.9	209 5.6	479 12.8	688 18.4
150.0-199.9	153 4.1	271 7.3	424 11.4
200.0-249.9	112 3.0	128 3.4	240 6.4
250.0-299.9	71 1.9	100 2.7	171 4.6
300.0-399.9	196 5.3	273 7.3	469 12.6
400.0-499.9	88 2.4	88 2.4	176 4.8
500.0-749.9	174 4.7	183 4.9	357 9.6
750.0-999.9	48 1.3	83 2.2	131 3.5
1000 -over	77 2.1	122 3.3	199 5.3
Total	1,329 35.6	2,401 64.4	3,730 100.0

Table 4.12.1 Distribution of Trips by Distance Intervals for the two Carrier Types Carrying Dangerous Goods

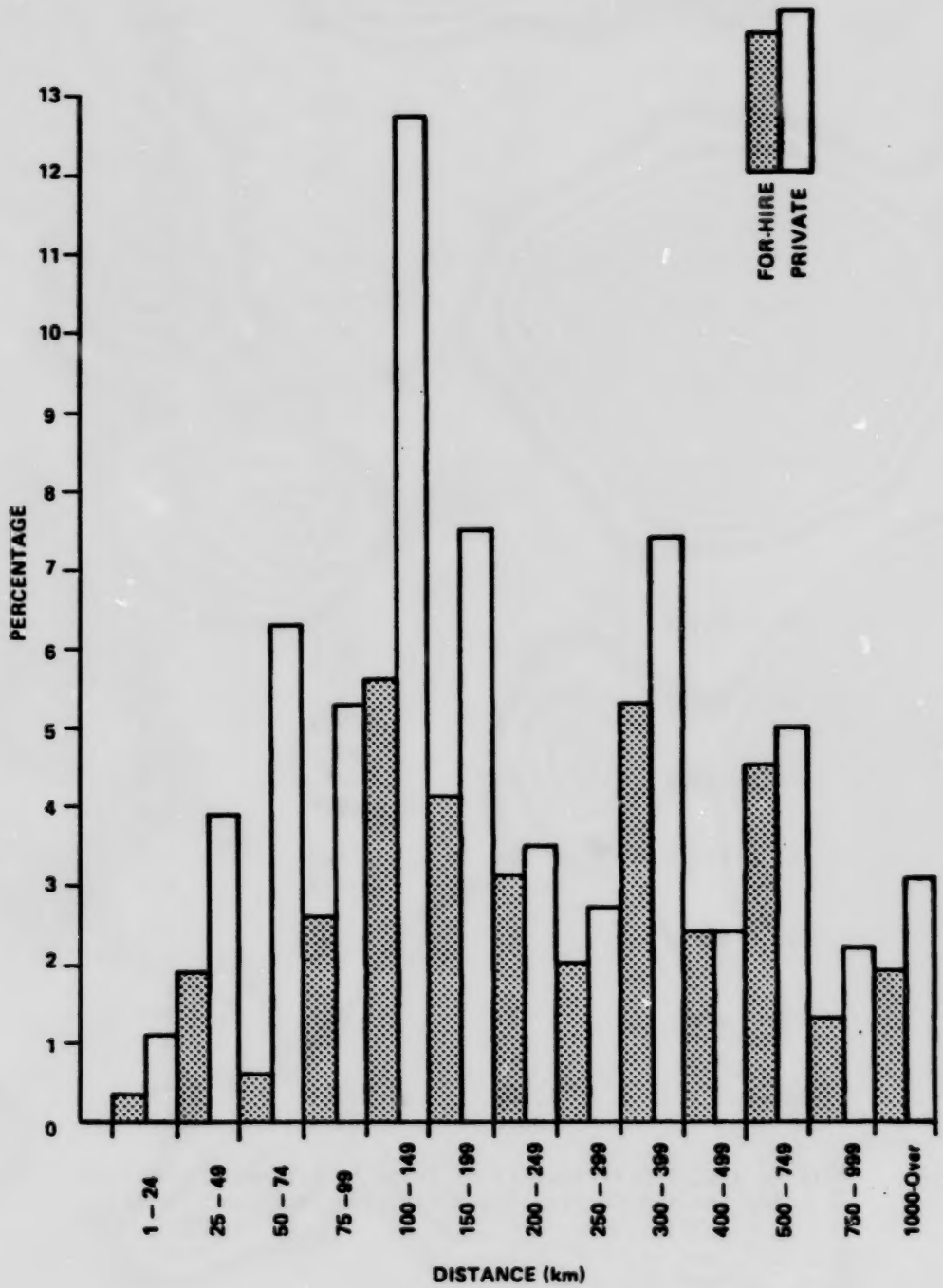

Figure 4.12.1 / Distribution of Trips by Distance Intervals for the two Carrier Types Carrying Dangerous Goods

5.0 BORDER MOVEMENTS

In this chapter results of analysis pertaining to border truck movements(i.e either one or both trip ends are outside the Province of Ontario) are documented. Border movements may be categorized into international, inter-provincial and in-transit movements. The in-transit movement is also otherwise referred to as the overland or the bridge movement. It can be sub-divided into in-transit (U.S.A) and in-transit (Canada). The in-transit movement forms a significant part(10.6%) of the border movement.

From section 2.3.1 the breakdown of the border movement as components of the overall movement in terms of movements and tonnages moved is shown below;

MOVEMENT TYPE	MOVEMENTS %	TONNAGES %
International	15.0	18.4
Inter-provincial	12.1	15.6
In-transit(U.S.A.)	2.3	3.2
In-transit(Canada)	0.5	0.7

Since the two in-transit components together is about 10% of the total border movement, in the ensuing sections in-transit movements are taken as a whole. Where appropriate data relating to the three main categories are presented alongside for ease of comparison.

Although only eight of the fourteen international border crossings were surveyed nearly 90% of the border movement has been captured in this survey.

5.1 VEHICLES

5.1.1 Truck Type by Body Type

Table 5.1.1 shows a crosstabulation of truck type by body type engaged in border movements.

Tractor-trailers are utilised for over 80% of all border movements with straight trucks forming about 8%.

As for bodystyles flatbed trucks at 14.4% form the next highest group after vans (58.3%). Tankers (9.2%) also form a significant group.

5.1.2 Motive Power

The tabulation shown below give the relative distribution of diesel, gasoline and propane powered trucks for the three components.

MOTIVE POWER	INTERNATIONAL #	INTERNATIONAL %	INTER-PROVINCIAL #	INTER-PROVINCIAL %	IN-TRANSIT #	IN-TRANSIT %	OVERALL #	OVERALL %
Diesel	6,508	94.8	5,345	95.2	1,403	94.3	13,256	94.9
Gasoline	341	5.0	249	4.4	84	5.7	674	4.8
Propane	16	0.2	18	0.4	-	-	34	0.3
Total	6,866	100.0	5,614	100.0	1,487	100.0	13,967	100.0

A large percent (95%) of the trucks engaged in the border movement are diesel powered due to economics of operation over longer distances. It is interesting to note that no propane powered trucks surfaced in the in-transit category.

5.1.3 Axle Configuration

Table 5.1.2 shows a cross-tabulation of truck body type by number of axles.

A slightly different distribution of vehicles by the number of axles than that for the overall population was seen. Over 70% of all trucks engaged in the border movement are five axle trucks and tractor combinations. Nearly 95% of this group are five axle tractor-trailers.

Table 5.1.3 shows the distribution of trucks by the number of axles for the components of the border movement.

From the above it is seen that though the distributions of trucks by number of axles for the three components of the border movement are broadly similar, the incidence of five axle trucks for the

international (80%) and the in-transit (76%) movements are higher than that for the inter-provincial (62%) movement. A salient point of observation is the high (6.5%) incidence of vehicles with eight or more axles in the in-transit category.

5.1.4 Energy Saving Devices

Table 5.1.4 shows the incidence of trucks with energy saving devices fitted.

The incidence of energy saving devices on trucks engaged in the trans-border movement is slightly higher than that for the survey population (22.3%). In the case of the inter-provincial movement a much higher figure of 27.4% is seen. Considering the average trip lengths for the inter-provincial and international movements it makes sense to install energy saving devices on trucks engaged in the border movement.

5.1.5 Registered Gross Vehicle Weight

Frequency distributions of the R G V W's for the two carrier types gave the following results.

CARRIER	MEAN kg	MEDIAN kg	MODE kg	CASES #
For-hire	43,000	40,000	36,400	6,301
Private	39,490	36,820	36,360	7,313
Overall	41,100	38,400	36,400	13,614

In comparison with the average R G V W (37,200 kg) for the survey population, a slightly larger vehicle (average R G V W 41,100 kg) is utilised in the border movement. The variation between the average R G V W of trucks used by the two carrier types is less than 10%.

Frequency distributions of the actual gross vehicle weights for the two carrier types show the results outlined below.

CARRIER	MEAN kg	MEDIAN kg	MODE kg	CASES #
For-hire	29,900	28,900	32,300	5,583
Private	26,000	23,670	35,300	6,125
Overall	27,840	27,000	35,300	11,708

It is noted that the mean actual gross vehicle weight for the trucks engaged in the border movement is about 67.7% of the mean R.G.V.W .

The tabulation below indicate the differences in statistics pertaining to R.G.V.W of trucks engaged in the different components of the border movement.

MOVEMENT TYPE	MEAN kg	MEDIAN kg	MODE kg	CASES #
International	40,540	36,400	36,360	6,697
Inter-provincial	41,550	41,000	50,000	5,497
In-transit	42,060	36,900	36,360	1,420
Overall	41,100	38,400	36,400	13,614

From the above it is seen that there is no great variation in the size of trucks used in the different categories of the border movement.

5.1.6 Leasing

The incidence of leased vehicles engaged in border movements are shown in the following table.

MOVEMENT TYPE	INCIDENCE(%)
International	27.7
Inter-provincial	24.3
In-transit	31.3
Overall	26.7

The incidence of leased vehicles in all three components of the border movements is high in comparison with the figure obtained for the population (20%).

5.1.7 Duration of Leasing

Over 40% of the leased trucks have been contracted out for five or more years as seen from Table 5.1.5. About 22% of the drivers who reported that the truck was rented/leased were unable or reluctant to offer information about the duration of leasing.

5.1.8 Vehicle Registration

Table 5.1.6 shows the distribution of Province/State of registration of trucks engaged in the border movement. The Province of Quebec has the highest interaction (14.2%) with Ontario followed by New York State (6.4%), Michigan (3.3%) and Manitoba (2.8%).

TRUCK TYPE

BODY TYPE	COUNT / ROW PCT / COL PCT / TOT PCT	1. STRAIGHT TRUCK	2. TRUCK & TRAILER	3. TRACTOR ONLY	4. TRACTOR & TRAILE	5. 2 TRAILE RS-B TR	6. 2 TRAILE RS-OTHER	7. OTHER	ROW TOTAL
OTHER	0.	19	25	123	220	11	11	17	426
		4.4	5.9	28.8	51.6	2.6	2.7	3.9	3.1
		1.6	3.6	100.0	1.9	3.7	4.8	15.8	
		0.1	0.2	0.9	1.6	0.1	0.1	0.1	
VAN	1.	708	386	—	5751	73	57	14	6990
		10.1	5.5	—	82.3	1.0	0.8	0.2	50.1
		61.3	54.9	—	50.7	24.2	24.1	13.7	
		5.1	2.8	—	41.2	0.5	0.4	0.1	
TEMP CONTROLLED	2.	121	29	—	983	7	4	3	1148
		10.5	2.6	—	85.6	0.6	0.4	0.3	8.2
		10.5	4.2	—	8.7	2.3	1.9	3.3	
		0.9	0.2	—	7.0	0.0	0.0	0.0	
CONCRETE MIX	3.	10	—	—	6	—	—	—	16
		61.7	—	—	38.3	—	—	—	0.1
		0.9	—	—	0.1	—	—	—	
		0.1	—	—	0.0	—	—	—	
STAKE	4.	71	26	—	603	37	15	4	756
		9.4	3.5	—	79.8	4.9	2.0	0.5	5.4
		6.2	3.7	—	5.3	12.3	6.2	3.6	
		0.5	0.2	—	4.3	0.3	0.1	0.0	
DUMP	5.	60	21	—	399	32	99	1	613
		9.8	3.5	—	65.2	5.2	16.1	0.2	4.4
		5.2	3.0	—	3.5	10.6	41.5	1.2	
		0.4	0.2	—	2.9	0.2	0.7	0.0	
TANKER	6.	54	57	—	1071	44	4	52	1282
		4.2	4.5	—	83.5	3.4	0.3	4.1	9.2
		4.6	8.1	—	9.4	14.6	1.9	49.9	
		0.4	0.4	—	7.7	0.3	0.0	0.4	
FLAT BED	7.	96	72	—	1721	72	44	9	2014
		4.8	3.6	—	85.4	3.6	2.2	0.4	14.4
		8.3	10.2	—	15.2	24.1	18.4	8.5	
		0.7	0.5	—	12.3	0.5	0.3	0.1	
CAR CARRIER	8.	16	67	—	520	16	3	4	626
		2.5	10.6	—	83.1	2.6	0.5	0.7	4.5
		1.4	9.5	—	4.6	5.4	1.3	4.1	
		0.1	0.5	—	3.7	0.1	0.0	0.0	
FLOAT	9.	—	20	—	65	9	—	—	93
		—	21.0	—	69.8	9.3	—	—	0.7
		—	2.8	—	0.6	2.9	—	—	
		—	0.1	—	0.5	0.1	—	—	
	COLUMN TOTAL	1155	704	123	11340	300	238	105	13964
		8.3	5.0	0.9	81.2	2.2	1.7	0.8	100.0

Table 5.1.1 / Distribution of Body Type by Truck Type for the Border Movements

TRUCK TYPE	NO. OF AXLES 2	3	4	5	6	7	8	9>	TOTAL
	(- - - - - - - - # / % of Tot. - - - - - - - -)								
Straight Truck	706	235	11	192	-	-	-	-	1155
	5.1	1.7	0.1	1.4					8.3
Tractor only	24	99	-	-	-	-	-	-	123
	0.2	0.7							0.9
Truck & trailer	23	9	45	490	102	34	1	-	704
	0.2	0.1	0.3	3.5	0.7	0.2	0.0		5.0
Tractor & trailer	8	89	446	9278	1043	326	104	42	11336
	0.1	0.6	3.2	66.5	7.5	2.3	0.7	0.3	81.2
Two Trailers (B-train)	-	-	-	37	31	90	112	30	300
				0.3	0.2	0.6	0.8	0.2	2.2
Two trailers (A-Train)	-	-	10	20	37	9	108	54	238
			0.1	0.1	0.3	0.1	0.8	0.4	1.7
Other	3	4	-	69	9	7	10	3	105
	0.0	0.0	0.0	0.5	0.1	0.0	0.1	0.0	0.8
TOTAL	764	436	512	10085	1233	466	335	129	13961
	5.5	3.1	3.7	72.2	8.8	3.3	2.4	0.9	100.0

Table 5.1.2 Distribution of Trucks by Truck Type and Number of Axles (Border Movement)

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RESEARCH UNIT FOR URBAN STUDIES
McMASTER UNIVERSITY
HAMILTON, ONTARIO

AXLES	INTERNATIONAL		INTER-PROVINCIAL		IN-TRANSIT		OVERALL	
#	#	%	#	%	#	%	#	%
2	331	4.8	366	6.5	68	4.5	764	5.5
3	188	2.7	277	4.0	22	1.5	436	3.1
4	243	3.5	212	3.8	57	3.8	512	3.7
5	5,471	79.7	3,486	62.1	1,132	76.1	10,085	72.2
6	353	5.1	803	14.3	77	5.2	1,233	8.8
7	85	1.2	348	6.2	34	2.3	466	3.3
8	130	1.9	160	2.8	45	3.1	335	2.4
9	33	0.5	9	0.2	41	2.7	83	0.6
=>10	31	0.2	4	0.1	10	0.7	46	0.3
TOTAL	6,866	100.0	5,614	100.0	1,487	100.0	13,961	100.0

Table 5.1.3 Distribution of Trucks by No. of Axles for the Components of Border Movement

DEVICE TYPE	INTERNATIONAL #	INTERNATIONAL %	INTER-PROVINCIAL #	INTER-PROVINCIAL %	IN-TRANSIT #	IN-TRANSIT %	OVERALL #	OVERALL %
Air Deflectors Only	951	13.9	795	14.2	178	12.0	1,925	13.8
Bubble Devices Only	443	6.5	668	11.9	94	6.3	1,205	8.6
Bubble and Deflectors	28	0.4	70	1.3	4	0.3	102	0.7
TOTAL	1,422	20.8	1,533	27.4	276	18.6	3,232	23.2

Table 5.1.4 Usage of Air Deflectors and Bubble Type Devices

UNITS	DAYS	WEEKS	MONTHS	YEARS
0	55 1.5	12 0.3	21 0.6	739 19.8
1	116 3.1	25 0.7	37 1.0	206 5.5
2	59 1.6	5 0.1	18 0.5	87 2.3
3	40 1.1	10 0.3	33 0.9	251 6.7
4	11 0.3	-	9 0.2	114 3.1
5	50 1.3	48 1.3	48 1.3	1,212 32.5
6	13 0.3	12 0.3	12 0.3	13 0.3
7	5 0.1	-	6 0.2	8 0.2
8	-	-	-	8 0.2
9	10 0.3	8 0.2	13 0.3	333 8.9
10	13 0.3		4 0.1	13 0.3
11	-	-	9 0.2	-
12	2 0.0	1 0.0	6 0.1	-
15	-	-	13 0.3	-
18	-	-	3 0.1	-
20	-	-	-	2 0.1
29	1 0.0	-	-	-
30	11 0.3	-	-	-

Table 5.1.5 Duration of Truck Leases - Border Movements

PROVINCE/STATE	FREQUENCY	PERCENT
Alberta	238	1.7
British Columbia	65	0.5
Manitoba	398	2.8
Saskatchewan	55	0.4
Western Provinces	756	5.4
Newfoundland	9	0.1
New Brunswick	92	0.7
Nova Scotia	50	0.4
P.E.I.	19	0.1
Atlantic Provinces	170	1.2
Quebec	1,983	14.2
Ontario	8,054	57.7
New York	898	6.4
Michigan	463	3.3
Minnesota	210	1.5
Pennsylvania	187	1.3
Ohio	149	1.1
Florida	93	0.7
Illinois	99	0.7
Indiana	69	0.5
California	31	0.2
All States	469	3.4
Unreported	336	2.4
TOTAL	13,967	100.0

Table 5.1.6 Registration of Trucks Engaged in the Border Movement

5.2 CARRIER

5.2.1 Base Province or State

The distribution of trucks by the Province or State in which the vehicles are based is shown in Table 5.2.1. The Province/State of registration is where the vehicle is based in the case of most trucks. Outside of Ontario the provinces where most trucks are based are Quebec(2010) and Manitoba(490).

5.2.2 Carrier Mix

The split between for-hire and private carriers for the component movements is shown below.

CARRIER TYPE	INTERNATIONAL #	INTERNATIONAL %	INTER PROVINCIAL #	INTER PROVINCIAL %	IN-TRANSIT #	IN-TRANSIT %	OVERALL #	OVERALL %
For-hire	3,140	45.7	2,626	46.8	677	45.5	6,442	46.1
Private	3,726	54.3	2,988	53.2	810	54.5	7,524	53.9
Total	6,866	100.0	5,614	100.0	1,487	100.0	13,966	100.0

The mix of carrier types in the three components is generally about the same, and is in line with this statistic obtained for the population (for-hire/private as 45:55).

5.2.3 Average Trip Length by Carrier Type

Frequency distributions of trip lengths for the two carrier types gave the following results.

CARRIER	MEAN km	MEDIAN km	CASES #
For-hire	746	479	6,343
Private	684	540	7,270
Overall	713	513	13,613

The average trip length for the border movement is 75% longer than that for the survey population. This is generally true for the trips executed by the two carriers.

PROVINCE/STATE	FREQUENCY	PERCENT
Alberta	270	1.9
British Columbia	49	0.4
Manitoba	490	3.5
Saskatchewan	56	0.4
Western Provinces	865	6.2
Newfoundland	17	0.1
New Brunswick	107	0.8
Nova Scotia	53	0.4
P.E.I.	14	0.1
Atlantic Provinces	191	1.4
Quebec	2,010	14.4
Ontario	7 701	55.1
New York	920	6.6
Michigan	527	3.8
Minnesota	204	1.6
Pennsylvania	173	1.2
Ohio	135	1.0
Florida	124	0.9
Illinois	90	0.6
Indiana	84	0.6
All States	792	5.6
Unreported	529	3.8
TOTAL	13,967	100.0

Table 5.2.1 Distribution of Trucks by Base Province or State

5.3 TRIP DETAILS

5.3.1 Origin-Destination of Trips

Table 5.3.1 show the origin-destination province/state for the extra-provincial movement. Only some selected states are shown in the matrix so as to keep it to a manageable size.

With respect to the border movements the interaction between Ontario and Quebec is the highest at 28% of all border trips, followed by that between Ontario and New York at 19%.

5.3.2 Type of Establishment at Trip Ends

Tabulation 5.3.2 shows the type of establishment at origin and the type of establishment at destination for the border movements.

The origin of most(43%) trips is manufacturing establishments and about 30% of all trips are destined to manufacturing organizations in the case of the border movements. Nearly 30% of all border movements have either one or both trip ends at a warehouse. As such they are the second most important category of trip end after manufacturing establishments.

In the case of the inter-provincial movements over a third of all trips originate at a manufacturing establishment. The destination of most(37%) trips are warehouses, followed by manufacturing establishments(22%).

5.3.3 Trip Length

Average trip lengths for the components of the border movement are shown tabulated below.

CARRIER	MEAN km	MEDIAN km	CASES #
International	494	389	6,778
Inter-provincial	910	564	5,521
In-transit	1,018	784	1,314

DESTINATION

ORIGIN	ALBERTA 0.	B.C. 1.	MANITOBA 2.	N.B. 3.	NFLD. 4.	N.S. 5.	ONTARIO 6.	P.E.I. 7.	QUEBEC 8.	SASK. 9.	NEW YORK 10.	MICHIGAN 11.	MINNESOTA 12.	PENNSYLV 13.	OHIO 14.	AREA 15.	OTHER ST 16.	ROW TOTAL
0.	129 50.3 76.0 0.9	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	96 37.4 0.6 0.7	0 0.0 0.0 0.0	10 3.9 0.7 0.1	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	32 12.5 3.2 0.2	255 1.8
1. ALBERTA	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	1 0.5 2.3 0.0	0 0.0 0.0 0.0	3 1.5 4.3 0.0	177 93.0 3.1 1.3	1 0.5 0.5 0.0	6 3.2 0.2 0.0	0 0.0 0.0 0.0	3 1.6 0.2 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	190 1.4
2. B.C.	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 1.5 0.0	0 0.0 0.0 0.0	1 1.0 2.1 0.0	95 95.0 1.6 0.7	0 0.0 0.0 0.0	3 3.0 0.1 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	99 0.7
3. MANITOBA	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	2 0.4 7.7 0.0	0 0.0 0.0 0.0	2 0.4 2.4 0.0	384 76.1 5.0 2.9	0 0.0 0.0 0.0	76 15.0 0.7 0.6	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	1 0.2 1.2 0.1	0 0.0 0.0 0.0	0 0.0 0.0 0.0	505 3.7
4. N.B.	0 0.0 0.0 0.0	1 2.4 0.8 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	37 90.2 1.0 0.4	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	1 2.4 0.1 0.0	39 0.4
5. NFLD	0 0.0 0.0 0.0	0 0.0 0.2 0.0	2 15.4 1.5 0.0	0 0.0 0.0 0.0	2 15.4 5.1 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	6 46.2 0.1 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	1 7.7 0.1 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	13 0.1
6. N.S.	0 0.0 0.0 0.0	2 2.9 1.3 0.0	1 1.1 0.8 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	75 84.3 1.1 0.5	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.3 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 3.1 0.1	0 0.0 0.0 0.0	0 0.0 0.0 0.0	89 0.6
7. ONTARIO	26 0.4 15.4 0.2	170 2.9 91.3 1.3	175 1.9 95.7 0.9	377 6.4 91.5 2.7	26 0.4 78.2 0.2	22 0.3 95.6 0.2	58 0.9 98.3 0.4	0 0.0 0.0 0.0	12 0.2 98.6 0.1	2201 35.8 84.2 16.3	69 1.0 87.1 0.5	1329 19.7 88.9 9.8	917 13.6 79.8 6.6	164 2.4 98.3 1.2	168 2.4 48.9 1.2	257 3.8 93.6 1.8	754 11.2 79.8 5.4	6752 48.3
8. P.E.I.	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.1 0.1	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	1 12.5 0.1 0.0	9 0.1
9. QUEBEC	11 0.4 7.5 0.1	5 0.7 3.4 0.0	2 0.1 1.4 0.0	16 2.4 3.4 0.1	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	1082 41.8 29.4 12.0	0 0.0 0.0 0.0	76 3.0 2.7 0.5	4 0.2 0.6 0.0	65 3.3 0.6 0.5	22 1.1 1.0 0.2	0 0.0 0.0 0.0	70 3.4 27.9 0.5	18 0.9 0.6 0.1	67 4.2 9.1 0.5	2586 16.7
10.	0 0.0 0.0 0.0	0 0.7 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	2 5.1 5.1 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	28 65.4 0.4 0.2	0 0.0 0.0 0.0	11 30.0 0.4 0.1	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	38 0.3
11.	0 0.0 0.0 0.0	5 0.4 0.0 0.0	1 0.0 0.4 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	1339 76.0 23.4 9.6	0 0.0 0.0 0.0	180 10.2 3.0 0.6	0 0.0 0.0 0.0	0 0.0 0.4 0.0	269 15.3 21.7 1.9	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	42 2.4 5.6 0.3	1762 12.6
12. U.S.A.	2 0.2 0.5 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	579 77.6 10.3 4.1	0 0.0 0.0 0.0	27 3.6 1.0 0.2	4 0.5 7.2 0.0	112 15.0 7.2 0.8	0 0.0 0.0 0.0	0 0.0 0.0 0.0	3 0.4 1.0 0.0	0 0.0 0.0 0.0	16 2.1 1.6 0.1	746 5.3
13. MINNESOTA	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	1 1.0 0.7 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	136 95.7 2.4 1.0	0 0.0 0.0 0.0	5 3.5 0.1 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	142 1.0
14. PENNSYLVANIA	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	240 92.3 4.3 1.8	0 0.0 0.0 0.0	20 7.7 0.7 0.1	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	260 1.9
15. OHIO	0 0.0 0.0 0.0	0 0.0 1.5 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	186 88.6 3.3 1.3	0 0.0 0.0 0.0	12 5.7 0.5 0.1	0 0.0 0.0 0.0	4 2.7 0.4 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	211 1.6
16. OTHER STATES	0 0.0 0.0 0.0	1 0.1 0.5 0.0	0 0.0 0.0 0.0	10 1.0 2.5 0.1	0 0.0 0.0 0.0	1 0.1 3.5 0.0	0 0.0 0.0 0.0	789 85.0 13.0 5.6	0 0.0 0.0 0.0	75 7.7 2.7 0.5	0 0.0 0.0 0.0	25 2.6 1.4 0.2	30 3.1 2.4 0.2	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	16 1.6 1.6 0.1	941 6.7
COLUMN TOTAL	169 1.2	186 1.3	131 0.9	404 2.9	39 0.2	23 0.2	60 0.4	5727 41.0	13 0.1	2709 19.4	79 0.6	1540 11.1	1339 9.9	172 1.2	250 1.8	275 2.0	767 5.8	13966 100.0

Table 5.3.1/ Origin-Destination of Border Movements

COUNT ROW % COL. % TOTAL % / ESTAB. AT DESTINATION / ESTAB. AT ORIGIN	AIR*	RAIL*	MARINE*	TRUCK*	POINT OF SALE/ CONSUMPTION	MANUFACTURER	WAREHOUSE	DISTRIBUTION CENTRE	OTHER	DON'T KNOW	TOTAL %
*AIR		33 59.5 50.7 0.2		5 8.8 0.3 –	4 6.5 0.3 –		12 21.3 0.4 0.1		2 3.9 0.1 –		271 0.4
*RAIL		2 4.5 3.8 –	1 2.8 1.2 –	7 15.9 0.4 0.1	18 41.3 1.7 0.1	5 12.4 0.1 –	3 7.6 0.1 –	1 2.3 0.1 –	6 13.1 0.3 –		44 0.3
*MARINE		1 1.9 2.6 –	– 0.4 0.3 –	9 12.5 0.5 0.1		20 27.8 0.5 0.1	31 42.6 1.0 0.2	2 3.0 1.0 –	9 11.9 0.5 0.1		73 0.5
*TRUCK	3 0.2 4.7 –	8 0.5 15.0 0.1	9 0.5 9.3 0.1	810 48.8 48.6 5.8	86 5.2 7.9 0.6	417 25.1 10.3 3.0	145 8.7 4.7 1.0	101 6.1 5.8 0.7	67 4.1 3.7 1.3	14 0.8 4.2 0.1	1659 11.9
PRIMARY SOURCE			15 1.5 15.0 0.1	28 2.9 1.7 0.2	113 11.6 10.4 0.8	400 41.3 9.9 2.9	105 10.8 3.4 0.7	187 19.3 10.8 1.3	114 11.8 6.3 0.8	7 0.7 2.0 –	969 6.9
MANUFACTURER	7 0.1 11.1 0.1	27 0.4 50.8 0.2	36 0.6 37.0 0.3	434 7.2 26.1 3.1	621 10.3 57.3 4.4	2478 41.0 61.0 17.7	1092 18.1 35.5 7.8	859 14.2 49.7 6.2	445 7.4 24.6 3.2	43 0.7 13.1 0.3	6043 43.3
WAREHOUSE	13 0.5 20.5 0.1	1 – 2.0 –	16 0.6 16.1 0.1	164 6.6 9.9 1.2	121 4.9 11.2 0.9	337 13.6 8.3 2.4	1370 55.3 44.6 9.8	254 10.2 14.7 1.8	185 7.5 4.6 1.3	15 0.6 4.6 0.1	2477 17.7
DISTRIBUTION CENTRE			6 0.9 6.2 –	84 12.2 5.0 0.6	70 10.2 6.4 0.5	89 13.0 2.2 0.6	118 17.2 3.8 0.8	253 36.9 14.6 1.8	59 8.7 3.3 0.4	7 1.0 2.1 0.1	685 4.9
OTHER	8 0.5 13.0 0.1	14 0.8 25.8 0.1	15 0.9 15.0 0.1	123 7.3 7.4 0.9	51 3.0 4.7 0.4	294 17.4 7.2 2.1	194 11.5 6.3 1.4	72 4.2 4.2 0.5	903 53.4 50.0 6.5	17 1.0 5.3 0.1	1691 12.1
DON'T KNOW				2 0.6 0.1 –		22 8.0 0.5 0.2	5 1.9 0.2 –		15 5.7 0.8 0.1	228 83.9 68.7 1.6	271 1.9
TOTAL %	64 0.5	53 0.4	98 0.7	1666 11.9	1083 7.8	4062 29.1	3074 22.0	1729 12.4	1806 12.9	331 2.4	13 966 100.0

*Terminals

Table 5.3.2 / Type of Establishment at Trip End (Border Movement)

5.4 LOAD

5.4.1 Load-Volume Utilization

As mentioned in Chapter 2 the responses recorded herein relate to the drivers perception of space utilization within known weight restrictions.

The distribution of movements by load-volume utilization for the three components of the border movement is shown in Table 5.4.1. It is seen that the incidence of the empty movement for the inter-provincial and in-transit movements were less (18%-23%) than that for the population (31.8%). A higher utilization of trucks is seen in comparison with the statistics for the population.

Table 5.4.2 shows the utilization of trucks engaged in the border movement by carrier type.

In comparing with the statistics obtained for the population (Table 2.2.4) the performance of both for-hire and private carriers engaged in the border movement is much better. The for-hire carriers seem to have a higher percent of fully loaded trucks and a lower percent of empty trucks than the private carriers.

5.4.2 Weight of Load Carried

Frequency distributions of commodity weight carried by weight classes for the two carrier types is shown in Table 5.4.3.

As was seen for the population the private carriers seem to have a larger share of the movements carrying commodities less than 10,000 kg. Commodity weight data for 26.5% of the movements was not available.

Section 5.5.3 shows the average weights of commodities carried by the two carrier types. As mentioned elsewhere weight of load carried is the same as the weight of commodities for most movements.

UTILI-ZATION	INTERNATIONAL #	INTERNATIONAL %	INTER-PROVINCIAL #	INTER-PROVINCIAL %	IN-TRANSIT #	IN-TRANSIT %	OVERALL #	OVERALL %
Empty	1,814	26.4	1,042	18.6	343	23.1	3,199	22.9
1/4 Full	358	5.2	271	4.8	72	4.8	701	5.0
1/2 Full	434	6.3	377	6.7	113	7.6	924	6.6
3/4 Full	446	6.5	553	9.8	106	7.1	1,105	7.9
Full	3,713	54.1	3,227	57.5	822	55.3	7,762	55.6
Dont Know	101	1.5	144	2.6	31	2.1	276	2.0
TOTAL	6,866	100.0	5,614	100.0	1,487	100.0	13,967	100.0

Table 5.4.1 Utilization of Trucks for the Components of the Border Movement

LEVEL OF UTILIZATION	CARRIER TYPE FOR-HIRE	PRIVATE	TOTAL
Empty	1,226 8.8	1,973 14.1	3,199 22.9
Quarter Full	287 2.1	413 3.0	700 5.1
Half Full	463 3.3	461 3.3	924 6.6
Three Quarter Full	512 3.7	593 4.2	1,104 7.9
Full	3,804 27.2	3,958 28.3	7,762 55,5
Don't Know	150 1.1	126 0.9	276 2.0
TJTAL	6,442 46.1	7,524 53.9	13,966 100.0

Table 5.4.2 Utilization of Trucks by Carrier Type in the Border Movement

COMMODITY Weight(kg)	CARRIER TYPE For-Hire	Private	Total
	(- - - - - - # / % of Tot - - - -)		
No data	1,337	2,361	3,698
	9.6	16.9	26.5
1- 2400	417	503	920
	3.0	3.6	6.6
2401- 5000	318	525	843
	2.3	3.8	6.1
5001-10000	529	767	1,296
	3.8	5.5	9.3
10001-15000	837	671	1,508
	6.0	4.8	10.8
15001-20000	1,223	1,086	2,309
	8.8	7.8	16.5
20001-25000	822	703	1,525
	5.9	5.0	10.9
25001-30000	268	323	592
	1.9	2.3	4.2
30001-35000	369	306	676
	2.6	2.2	4.8
35001-40000	162	134	296
	1.2	1.0	2.2
40001-45000	97	63	160
	0.7	0.4	1.1
45001-50000	6	31	37
	0.1	0.2	0.3
50001-55000	30	14	44
	0.2	0.1	0.3
55001- over	57	51	109
	0.4	0.3	0.7
TOTAL	6,442	7,524	13,966
	46.1	53.9	100.0

Table 5.4.3 Distribution of Commodity Weight Classes by Carrier Type

5.5 COMMODITIES

5.5.1 Commodities Carried

A partial listing of the most frequently carried commodities in the border movement is shown in Table 5.5.1

Road motor vehicles and automotive parts, iron/steel and alloys, and paper and paperboard rank first, second and third in the most frequently carried commodities without taking into consideration Commodity no. 99 which includes commodities that do not fall into any other category.

The for-hire carriers appear to have a larger share of the movements in the above three categories. Private carriers seem to have a larger portion of the movement of commodities such as fabricated wood materials and chemical products.

5.5.2 Dangerous Goods

The incidence of the carriage of dangerous goods for the inter-provincial, international and in-transit movements are 14.1%, 5.0% and 4.9% respectively. Placards or warning signs are displayed on 41.5%, 51.3% and 30.7% of the trucks carrying dangerous goods in the three categories respectively.

The distribution of dangerous goods by class for the three component movements is shown in Table 5.5.2.

Two-thirds of all movements both for the international and the inter-provincial movements are in the flammable and combustible class. In the case of the in-transit movement nearly a third of all such movements fall into the corrosive substances class. Movements of flammable and combustible liquids and flammable solids each form nearly one-fifth of the in-transit movements.

5.5.3 Weight of Commodities

The average weight of load for the most frequently carried commodities is shown in Table 5.5.3

Movements of petroleum products, iron/steel and alloys, chemical products and wood fabricated materials on average weigh in excess of 20 tonnes per load.

Frequency distributions of commodity weights for the two carrier types show the following results.

CARRIER	MEAN kg	MEDIAN kg	MODE kg	CASES #
For-hire	17,420	17,843	20,000	5,106
Private	15,884	15,942	20,000	5,163
Overall	16,698	16,862	20,000	10,269

It is noted that the average weight of commodity being carried is slightly larger than that for the survey population(14,700kg).

5.5.4 Commodity Movement

The extent of the overall commodity movement between provinces/states is shown in Table 5.5.4. The main inter-provincial movement of commodities is between Ontario and Quebec at 29.1% of the overall commodity movement across the provincial border. The aggregate movement between Ontario and the United States is 48% of the total border movement.

COMMODITY		CARRIER TYPE		
No.	Commodity	For-hire	Private	Total
		(- - - # /	% of Tot	- - -)
58	Road Motor Vehicle and automotive parts	806 5.8	411 2.9	1,217 8.7
99	Commodities that do not fall into any other category.	635 4.5	365 2.6	1,000 7.2
44	Iron,steel and Alloys	536 3.8	347 2.5	883 6.3
35	Paper and Paper-Board	314 2.2	296 2.1	609 4.3
33	Wood Fabricated Materials	174 1.2	364 2.6	538 3.8
47	Non-metallic mineral Basic Products	186 1.3	198 1.4	384 2.7
74	Furniture and Fixtures	202 1.4	172 1.2	374 2.6
42	Chemical and Related Products	155 1.1	202 1.4	357 2.5
43	Petroleum and Coal Products	122 0.9	221 1.6	343 2.5
14	Foods,Food Materials and Food Preparation	127 0.9	197 1.4	324 2.3
40	Chemical Products	99 0.7	213 1.5	312 2.2
01	Meat and Meat Products	153 1.1	136 1.0	289 2.1
	TOTAL	6,442 46.1	7,524 53.9	13,966 100.0

Table 5.5.1 Partial Listing of the Most Frequently Carried Commodities for the Border Movements.

CLASS	INTER-NATIONAL	INTER-PROVINCIAL	IN-TRANSIT
	(- - - - - # / Col.% - -)		
1.Explosives	9	9	1
	2.5	1.1	1.6
2.Gases(compressed)	38	85	3
	11.1	10.7	3.5
3.Flammable and Combustible Liquids	226	513	16
	65.3	64.7	22.3
4.Flammable Solids	1	14	16
	1.1	1.7	22.3
5.Oxidizing Agents	6	39	2
	1.7	4.9	2.1
6.Poisonous and Infectious Material	14	27	-
	4.2	3.4	
7.Radioactive	2	2	5
	0.5	0.2	6.2
8.Corrosive Substances	36	63	23
	10.4	8.0	31.3
9.Miscellaneous Goods	11	41	8
	3.1	5.2	11.2
TOTAL	346	793	74
	100.0	100.0	100.0

Table 5.5.2 Distribution of Dangerous Goods by Class for the Border Movements

COMMODITY		CARRIER TYPE (Average Weight per Movement) (Tonnes)		
No.	Commodity	For-hire	Private	Total
43	Petroleum and Coal Products	22.70	23.24	23.04
44	Iron,steel and Alloys	23.79	21.60	22.93
40	Chemical Products	25.42	19.91	21.66
47	Non-metallic mineral basic Products	22.44	19.10	20.72
33	Wood Fabricated Materials	23.04	19.15	20.41
35	Paper and Paper-Board	17.53	15.33	16.49
42	Chemical and Related Products	16.19	15.58	15.85
14	Foods,Food Materials and Food Preparation	18.98	13.54	15.62
01	Meat and Meat Products	16.01	13.85	14.99
58	Road Motor Vehicle and automotive parts	15.89	10.04	13.92
99	Commodities that do not fall into any other category.	11.52	11.11	11.36
74	Furniture and Fixtures	7.09	5.95	6.57
	GENERAL AVERAGE	17.40	15.90	16.70

Table 5.5.3 Average Weight of Load for the Most Frequently Carried Commodities in the Border Movements by Carrier Type.

DESTINATION

ORIGIN	ALBERTA	B.C.	MANITOBA	N.B.	N.S.	P.E.I.	ONTARIO	QUEBEC	NEW YORK	MICHIGAN	MINNESOTA	PENNSYLVANIA	OHIO	OTHER ST. STATES	ROW TOTAL
	0.2	1.1	2.3	3.1	[illegible]	[illegible]	7.3	[illegible]	[illegible]	12.1	13.3	14.1	15.2	16.3	
0.	17	0	0	0	0	0	0	0	0	0	0	0	0	0	633
	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
1. ALBERTA	0	0	0	0	0	31	2844	33	85	73	0	0	0	0	3401
	0.0	0.0	0.0	0.0	0.1	1.4	91.4	0.4	3.9	0.0	0.0	0.0	0.0	0.0	2.2
	0.0	0.0	0.0	0.0	0.7	3.2	3.5	0.9	0.2	0.0	0.0	0.0	0.0	0.0	
	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	7.0	0.0	0.0	0.0	0.0	0.0	
2. B.C.	0	0	0	0	0	1	32	0	42	0	0	0	0	0	9[illegible]
	0.0	0.0	0.0	0.0	0.2	0.1	1.1	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.6
	0.0	0.0	0.0	0.0	0.4	0.1	1.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
3. MANITOBA	0	0	0	0	24	6	23	6897	6	1045	0	0	0	0	5673
	0.0	0.0	0.0	0.0	0.4	0.0	0.4	70.3	0.0	10.7	0.0	0.0	0.0	0.0	2.4
	0.0	0.0	0.0	0.0	10.1	0.0	2.3	0.6	0.0	0.1	0.0	0.0	0.0	0.0	
	0.0	0.0	0.0	0.0	0.0	0.0	0.4	2.7	0.0	0.4	0.0	0.0	0.0	0.0	
4. N.B.	0	25	0	0	0	0	0	0	0	0	0	0	0	0	491
	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1
	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
5. NFLD.	0	0	32	0	32	0	0	0	0	0	24	0	0	0	134
	0.0	0.7	10.6	0.0	27.9	0.0	0.0	0.0	0.0	0.0	33.6	0.0	0.0	0.0	0.3
	0.0	0.2	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
6. N.S.	0	20	0	0	0	0	0	0	0	0	0	0	0	0	421
	0.0	7.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9
	0.0	1.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
7. ONTARIO	24	2700	1499	2004	270	157	920	0	240	31[illegible]	0	240	2[illegible]	17[illegible]	21[illegible]	4[illegible]	9[illegible]	9[illegible]
	0.1	2.3	1.6	5.3	0.3	0.2	1.0	0.0	0.3	32.0	0.0	21.5	15.3	1.0	2.3	4.9	9.0	36.3
	0.3	93.7	97.1	96.4	98.2	99.4	95.2	0.0	95.1	86.4	0.0	89.2	79.1	95.3	89.9	95.1	78.4	
	0.0	1.3	0.9	3.0	0.2	0.1	0.5	0.0	0.1	30.3	0.0	12.0	0.4	1.0	1.3	2.7	3.5	
8. P.E.I.	0	0	0	0	0	0	0	159	0	0	0	0	0	0	0	0	0	39	379
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.1	0.3
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
9. QUEBEC	511	35	19	170	0	0	0	18434	0	930	90	1121	840	0	1387	2[illegible]	3[illegible]	2[illegible]	24[illegible]
	2.1	0.1	0.1	0.7	0.0	0.0	0.0	74.9	0.0	3.8	0.4	4.5	2.2	0.0	5.6	1.0	5.9	34.4
	87.4	1.3	1.2	3.4	0.0	0.0	0.0	32.3	0.0	2.9	7.7	4.0	2.0	0.0	32.4	4.9	21.9	
	0.3	0.0	0.0	0.1	0.0	0.0	0.0	10.8	0.0	0.5	0.1	0.7	0.5	0.0	0.6	0.1	0.0	
10. SASK.	0	0	0	0	0	0	0	282	0	210	0	0	0	0	0	0	0	0	427
	0.0	0.0	0.0	0.0	1.4	0.0	0.1	47.4	0.0	51.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
	0.0	0.0	0.0	0.0	1.6	0.0	0.1	0.6	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
11. NEW YORK	0	0	32	0	0	0	0	8259	0	1190	0	7	4035	0	0	0	0	67[illegible]	34167
	0.0	0.0	0.1	0.0	0.0	0.0	0.0	30.3	0.0	0.4	0.0	0.0	20.4	0.0	0.0	0.0	0.0	4.0	8.3
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.4	0.0	3.3	0.0	0.0	20.0	0.0	0.0	0.0	0.0	3.4	
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	0.0	0.7	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.4	
12. MICHIGAN	2	0	0	0	0	0	0	4[illegible]	0	372	200	127[illegible]	0	0	21	0	0	1[illegible]	6967
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	79.2	0.0	8.4	2.0	12.4	0.0	0.0	0.3	0.0	0.0	2.0	4.3
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	1.0	17.0	5.5	0.0	0.0	0.4	0.0	0.0	1.4	
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.2	0.1	0.7	0.0	0.0	0.0	0.0	0.0	0.1	
13. MINNESOTA	0	0	0	6	0	0	0	1305	0	80	0	0	0	0	0	0	0	0	1391
	0.0	0.0	0.0	0.5	0.0	0.0	0.0	95.6	0.0	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8
	0.0	0.0	0.0	0.1	0.0	0.0	0.0	2.3	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
14. PENNSYLVANIA	0	0	0	0	0	0	0	2544	0	212	0	0	0	0	0	0	0	0	2778
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	92.4	0.0	7.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
15. OHIO	0	38	0	0	0	0	0	2083	0	287	0	0	0	0	0	0	0	0	2348
	0.0	1.5	0.0	0.0	0.0	0.0	0.0	87.5	0.0	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4
	0.0	1.5	0.0	0.0	0.0	0.0	0.0	3.6	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
16. OTHER STATES	0	30	0	0	0	0	0	9972	0	920	0	43	0	0	0	0	0	20[illegible]	11382
	0.0	0.1	0.0	0.0	0.0	0.0	0.0	88.2	0.0	8.1	0.0	0.4	0.0	0.0	0.0	0.0	0.0	2.5	6.6
	0.0	0.7	0.0	0.0	0.0	0.0	0.0	17.4	0.0	2.5	0.0	0.1	0.0	0.0	0.0	0.0	0.0	2.4	
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	
COLUMN TOTAL	24[illegible]	2355	1544	5250	354	160	980	57219	241	34782	1144	22140	19390	1049	2330	4950	1274[illegible]	17,407	100.0
	0.2	1.4	0.9	3.3	0.2	0.1	0.6	33.4	0.2	21.4	0.7	13.5	11.3	1.1	1.9	2.9	7.3		

Note: In Tonnes per Average Day

Table 5.5.4/ Overall Commodity Movement between States / Provinces

5.6 DRIVER

5.6.1 Driver Employment

A distribution of driver employment categories is shown in Table 5.7.1.

The majority(77%) of the drivers reported that they were company employees. The percentages for drivers employed by broker and agency firms are 9.0% and 4.8% respectively.

A tabulation of driver employment categories by industry segment is shown in Table 5.6.1.

About three-quarters of drivers in each carrier category are company drivers. Private carriers seem to engage agency drivers much more than for-hire carriers.

For those drivers who have been employed by an Agency the duration of work for a particular shipper is shown in Table 5.6.2.

About two-thirds of the drivers working for agencies have done so for one or more years. Nearly a third of all drivers engaged in the border movement showed some reluctance to answer the question about the duration of employment.

DRIVER EMPLOYMENT	FOR-HIRE	PRIVATE	TOTAL
	(- - - # / % of Tot. - - -)		
Broker	915	311	1,226
	6.6	2.2	8.8
Company Driver	4,862	5,892	10,754
	34.8	42.2	77.0
Self	493	650	1,144
	3.5	4.7	8.2
Driver Agency	66	507	573
	0.5	3.6	4.1
Don't Know	105	163	268
	0.8	1.2	2.0
TOTAL	6,441	7,522	13,963
	46.1	53.9	100.0

Table 5.6.1 Distribution of Driver Employment Categories by Carrier

UNITS	DAYS	WEEKS	MONTHS	YEARS
0	3 0.6	5 0.9	9 1.5	80 13.9
1	20 3.6	-	13 2.3	29 5.1
2	21 3.7	4 0.8	13 2.3	25 4.4
3	-	-	16 2.7	33 5.8
4	4 0.8	-	1 0.2	9 1.5
5	27 4.7	9 1.5	4 0.7	37 6.5
6	-	-	1 0.2	2 0.3
7	-	-	-	9 1.6
8	-	-	2 0.3	-
9	9 1.6	-	18 3.1	20 3.5
10	-	-	-	12 2.1
12	1 0.2	-	-	4 0.7
15	-	-	-	5 0.9
30	-	-	1 0.1	-

Table 5.6.2 Distribution of Periods of Employment of Drivers from Driver Agencies

6.0 SUMMARY OF STATISTICS

The analysis to this point dealt with the 20% sample surveyed at the different stations. The survey covered only commercial trucks which passed through the,

- Truck inspection stations (43)
- International border crossings (8)
- Interprovincial border crossings (3)

in a 24 hour period.

The truck traffic within the urban areas and on many of the secondary and tertiary highways were not surveyed. These figures reflect the major portion of the inter-city commercial vehicle movement. In using the summary statistics outlined here the importance of understanding the survey methodology and the limitations are stressed.

6.1 TRUCK MOVEMENT

The number of truck trips through all the stations in a 24 hour day was 65,800. Due to the location of the stations the long distance trips passes through more than one survey station and are likely to be counted more than once. After rationalization of the long distance trips to remove this bias the number of movements in the Province of Ontario from this survey reduces to 45,800. Table 2.3.1(a) shows the inter-regional movement of trucks for 1983.

6.1.1 Carrier Share

The mix of for-hire and private carriers in terms of the different criteria are shown below.

IN TERMS OF	FOR-HIRE	PRIVATE
Movement	44.8	55.2
Truck-kilometres	49.4	50.6
Tonnes	52.9	47.1
Tonne-kilometres	54.7	45.3

On the above basis the private carriers made more trips than the for-hire carriers but in terms of tonnage of commodities transported

the for-hire carriers performed better by transporting more than the private carriers. In terms of distance travelled the private carriers overall covered more ground.

6.1.2 Intra and Extra Provincial Movement

The distribution of the intra and extra provincial activity in terms of the movements and weight of load carried are shown below.

MOVEMENT TYPE	TONNES %	MOVEMENTS %
Intra-provincial	61.9	69.9
International	18.5	15.1
Inter-provincial	15.6	12.2
In-transit	4.0	2.8

The extra-provincial movement in terms of tonnage is significantly more than that in terms of movements.

6.1.3 Lease-rental Truck Activity

The incidence of lease-rental trucks for the intra-provincial and border movements are different. The lease-rental activity was seen to be about 9,200 movements, this being about 20% of the overall movements. Nearly 5,500 movements of this number were confined to Ontario only, while 3,700 movements were extra-provincial in nature (international, inter-provincial and in-transit trips). It is stressed that the estimates provided above reflect only that part of the rental/lease activity confined to the inter - city highway movement. They do not include the activity that goes on in the area of urban trucking (especially short term rentals/leases).

6.2 COMMODITY MOVEMENT

The overall commodity movement in this survey was about 450,250 tonnes. The distribution of the commodity movement by commodity groups is shown in Table 6.2.1. The commodity movement within Ontario is 62% of the overall movement. The international and inter-provincial commodity movements were 82,600 and 70,300 tonnes respectively.

Tables 6.2.2 and 6.2.3 indicate the commodity movement to and from Ontario by the six commodity groups. It can be seen that a high

proportion of the commodity movement to the Atlantic provinces was in Group 1 (Live animals, Food, Beverages and Tobacco)

The flow of "Fabricated Materials" as a group to the U.S.A was substantial as compared with all other commodities. Motor vehicles and parts forms the next significant group by way of export commodities.

6.3 EMPTY MOVEMENT

The empty truck movements are 14,559 per average day. In terms of distance travelled at an average trip length of 243 km this translates to 3.54 million km. This figure refers to vehicles running completely empty. Partially loaded (less than a full load) trucks comprise another 24.2% of all trucks. Considering the operating costs, road construction / maintenance costs, congestion costs and social costs associated with the empty movement any reduction in the empty movement would yield economic benefits.

The percent empty for the different components of the overall movement is tabulated below.

MOVEMENT TYPE	MOVEMENTS #	% EMPTY %
Intra-provincial	31,836	35.7
International	6,866	26.4
Inter-provincial	5,613	18.4
In-transit	1,485	23.5
TOTAL	45,800	31.8

The intra-provincial movement has the highest percent empty.

6.4 DANGEROUS GOODS MOVEMENT

Table 6.4.1 shows the distribution of the movements, distance travelled and tonnage for the different classes of dangerous goods.

Tables 6.4.2 and 6.4.3 show the distribution of the dangerous goods movement by number of movements and tonnage moved by class of dangerous goods.

6.5 BORDER MOVEMENTS

The distribution of truck movement and tonnage by origin-destination for 1983 was shown in Tables 5.3.1 and 5.5.4. The figures for the border movements are likely to be underestimates since some trips between Ontario and the United States do not pass through the survey locations. The extent of this underestimation was determined using data collected by Statistics Canada at the international border crossings. A multiplier of 1.11 may be applied to the international trip interactions to account for the underestimation.

6.5.1 International Movement

About 15% of all truck movements are international in nature and this is about 6,900 movements in terms of the survey. It was also seen that 7.8% of all trips were destined to the U S A while only 7.2% originated from the United States. In terms of weight of goods carried this translates to 82,600 tonnes with just less than two-thirds of this being exports to U.S.A. and the balance being imports.

6.5.2 Inter Provincial Movement

The aggregate percentage of trips with one end in Ontario was 12.2%. It was seen that 5.3% of the total trips entered Ontario from the other provinces and 6.9% left Ontario to the other provinces. Of the 5,613 inter-provincial movements, nearly 3,170 movements were destined to the other provinces. In other words about 640 more movements left the Province than entered.

The commodity movement involved is about 42,700 tonnes out of Ontario to the other provinces and an inflow of 27,600 tonnes from the other provinces.

6.5.3 Overland Movement (in-transit)

The overland trips formed 2.8% of all trips. The overland movement shown elsewhere was about 1,500. The commodity movement relating to this is about 17,450 tonnes.

COMMODITY GROUP	MOVEMENTS #	MOVEMENTS %	TONNAGE #	TONNAGE %
I. Live Animals, Food, Tobacco, Beverages	20,934	45.7	89,601	19.9
II. Crude Materials Inedible	3,664	8.0	77,879	17.3
III Fabricated Materials Inedible	9,611	20.9	172,725	38.4
IV. End Products Inedible	4,254	9.3	28,682	6.4
V. Motor Vehicles and Parts	4,135	9.1	49,390	10.9
VI. Miscellaneous End Products	3,194	7.0	31,961	7.1
TOTAL	45,792	100.0	450,238	100.0

Table 6.2.1 Distribution of Commodity Movement by Commodity Groups

ORIGIN	WESTERN		ONTARIO		QUEBEC		ATLANTIC		U S A	
COMMODITY GROUP	#	Tonne	#	Tonne	#	Tonne	#	Tonne	#	Tonne
I. Live Animals, Food, Tobacco, Beverages	103	1,878	4,728	59,146	218	2,978	30	627	317	5,574
II. Crude Materials Inedible	18	352	2,671	60,633	45	1061	5	13	264	5,350
III Fabricated Materials Inedible	132	3,001	5,447	92,556	514	10,065	22	367	624	10,806
IV. End Products Inedible	126	801	2,692	16,608	232	1,867	21	159	230	2,274
V. Motor Vehicles and Parts	29	456	2,565	29,273	68	878	6	75	354	3,946
VI. Miscellaneous End Products	77	1,182	2,142	20,308	165	1598	18	197	140	1,077
TOTAL	487	7,703	20,264	278,762	1,244	18,454	102	1,438	1,929	29,027

Table 6.2.2 Distribution of Commodity Movement Destined to Ontario by Commodity Groups and Origin

DESTINATION	WESTERN		ONTARIO		QUEBEC		ATLANTIC		U S A	
COMMODITY GROUP	#	Tonne	#	Tonne	#	Tonne	#	Tonne	#	Tonne
I. Live Animals, Food, Tobacco, Beverages	142	2,324	4,728	59,146	322	6,231	20	412	411	7,036
II. Crude Materials Inedible	24	265	2,671	60,633	127	3,521	-	-	211	5,199
III Fabricated Materials Inedible	174	3,882	5,447	92,556	614	14,152	28	496	1,304	28,506
IV. End Products Inedible	158	1,293	2,692	16,608	199	1,732	27	359	230	2,198
V. Motor Vehicles and Parts	46	453	2,565	29,273	154	2,238	5	76	638	9,533
VI. Miscellaneous End Products	95	1,426	2,142	20,308	313	3,536	14	292	86	1,046
TOTAL	640	9,643	20,264	278,762	1,733	31,410	94	1,634	2,881	53,521

Table 6.2.3 Distribution of Commodity Movement Originating in Ontario by Commodity Groups and Destination

DANGEROUS GOODS CLASS	MOVEMENTS #	DISTANCE x 1000km	TONNAGE x1000tonne
1. Explosives	72	49	972
2. Gases	471	154	5,974
3. Flammable Liquids	2,345	723	33,440
4. Flammable Solids	139	58	3,416
5. Oxidizing Agents	114	44	2,165
6. Poisonous & Infectious	46	20	1,007
7. Radioactive	17	13	327
8. Corrosive	254	92	5,322
9. Miscellaneous	272	79	2,726
Total	3,730	1,232	55,348

Table 6.4.1 Movements, Distance Travelled and Tonnage Carried by Class of Dangerous Goods per Average Day

ORIGIN	WESTERN		ONTARIO		QUEBEC		ATLANTIC		U S A	
DANGEROUS GOODS	#	Tonne	#	Tonne	#	Tonne	#	Tonne	#	Tonne
1. Explosives	-	-	47	603	4	31	-	-	9	128
2. Gases	5	5	307	3,904	13	174	-	-	38	186
3. Flammable Liquids	43	1,162	1,474	20,842	85	1,143	-	-	226	1,964
4. Flammable Solids	4	43	96	2,212	8	230	-	-	4	91
5. Oxidizing Agents	2	44	50	1,013	7	76	-	-	6	15
6. Poisonous & Infectious	-	-	15	167	-	-	-	-	14	264
7. Radioactive	4	77	7	169	-	-	-	-	2	2
8. Corrosive	4	78	149	3,209	11	243	-	-	36	555
9. Miscellaneous	3	68	202	1,326	11	325	-	-	11	235
Total	64	1,477	2,346	33,445	138	2,222	-	-	346	3,441

Table 6.4.2 Distribution of Dangerous Goods Movement Destined to Ontario by Class and Origin

DESTINATION	WESTERN		ONTARIO		QUEBEC		ATLANTIC		U S A	
DANGEROUS GOODS	#	Tonne	#	Tonne	#	Tonne	#	Tonne	#	Tonne
1. Explosives	5	68	47	603	6	98	-	-	-	-
2. Gases	12	311	307	3,904	32	360	5	83	47	877
3. Flammable Liquids	15	164	1,474	20,842	175	1,741	4	90	287	5,736
4. Flammable Solids	-	-	96	2,212	2	67	-	-	10	260
5. Oxidizing Agents	3	16	50	1,013	13	349	-	-	33	613
6. Poisonous & Infectious	1	1	15	167	3	138	-	-	13	437
7. Radioactive	-	-	7	169	-	-	-	-	-	-
8. Corrosive	1	18	149	3,209	4	140	-	-	27	692
9. Miscellaneous	3	33	202	1,326	3	60	-	-	31	549
Total	39	611	2,346	33,445	239	2,953	9	174	446	9,164

Table 6.4.3 Distribution of Dangerous Goods Movement Originating in Ontario by Class and Destination

REFERENCES

1. Ontario Commercial Truck Survey, 1978, Ministry of Transportation and Communication, Ontario, March 1980.

2. Truck Movements Between United States - Ontario(Canada) (Border Crossings), Max Perera, M.T.C.(Ontario), December 1982.

APPENDIX A-1

LISTING OF SURVEY STATION LOCATIONS

Region 2- Central

District		Station Location
Toronto East	210 Whitby	Hwy 401-1.4 mi.W Hwy 12,S Side
21	211 Bowmanville	Hwy 401-1/2 mi.E Bowmanville,N
	212 Woodbridge	Hwy 400-2.3 mi.N Hwy 7
	213 King	Hwy 400-1.3 mi.N King Side Road
Toronto West	221 Streetsville S	Hwy 401 at Streetsville
22	222 Streetsville N	Hwy 401 at Streetsville
	223 Cooksville	Hwy 5-2 mi. W of Cooksville
	224 Victoria	Hwy 10 at Victoria
Hamilton	230 Winona	QEW-1/2 mi.W of Winona Rd. S
23	231 Oakville	QEW-Kerr St.,Oakville N Side
	232 Fruitland	QEW-E of Cherry Beach Rd.
	233 Fort Erie	QEW at Concession St.,Fort Erie
	234 Bismarck	Hwy 20 at Intersection Hwy 57

Region 3- Southwestern

London	311 Putnam N	Hwy 401 w of Putnam Rd. N Side
31	312 Putnam S	Hwy 401 W of Putnam Rd. S Side
Windsor	321 Windsor N	Hwy 401-1.7 mi.W of Int. 3
32	322 Windsor S	Hwy 401-2.9 mi.E of Int. 3
	323 Sarnia N	Hwy 402-3 mi.E of Cty.Rd.
	324 Sarnia S	Hwy 402-3 mi.E of Cty.Rd.

Region 4- Eastern

Kingston	411 Gananoque N	Hwy 401-5.1 mi.W of Hwy 137
41	412 Gananoque S	Hwy 401-5.3 mi.W of Hwy 137
	413 Lancaster N	Hwy 401 Int.Hwy 2 at Lancaster
	414 Lancaster S	Hwy 401-8 mi.E of Lancaster
	415 Prescott N	Hwy 401-1 1/4 mi.E of Prescott
Ottawa	421 Alfred	Hwy 17-1 mi.W of Alfred
42	422 Glen Tay	Hwy 7-3 mi.W of Perth
	423 Pembroke	Hwy 17 W of Pembroke
	424 Casselman	Hwy 417-1 mi.W Hwy 138 N Side

APPENDIX A-2

LISTING OF SURVEY STATION LOCATIONS

Region 5- Northern

District	Station #	Station Location
North Bay	511 North Bay S	Hwy 11-1/2 mi.S of Nipissing Jct
51	512 North Bay W	Hwy 17 W end of North Bay bypass
	514 Gravenhurst W	Hwy 11-1.6 mi.S Hwys 69 & 11B
	516 Huntsville	Hwy 60-8 mi.E of Huntsville
N Timmins	521 Cochrane	Hwy 11 at Third Ave.,Cochrane
52	522 Hearst E	Hwy 11, Hearst
	523 New Liskeard	Hwy 11-5 mi.N of New Liskeard
S.Ste Marie	531 S. Ste. Marie	Hwy 17-5.5 mi.N of City limits
53	532 Spragge	Hwys 17 and 108

Region 6- Northwestern

Thunder Bay	612 Thunder Bay S	Hwys 11/17-4 mi.W of Thunder Bay
61	612 Thunder Bay N	Hwy 102-3 mi.NW of Thunder Bay
	613 Red Rock	1/2 mi.E of Jct. 17 & 628
Kenora	621 Dryden	Hwy 17-1 mi.E of Dryden
62	622 Vermillion Bay	Hwy 17, Jct. Hwys 17 & 105
	623 Keewatin	Hwy 17 at Keewatin
	624 Crozier	Hwy 11-5 mi.W of Fort Frances

N.B. Station 623 Keewatin is approximately 40 km east of Manitoba border.

APPENDIX A-3

LISTING OF SURVEY STATION LOCATIONS

Ontario Location	US Location		Station No.	Link
Queenston	Lewiston	N.Y.	744	Bridge
Cornwall	Rooseveltown	N.Y.	746	Bridge
Sault Ste Marie	Sault Ste Marie	Mich.	747	Bridge
Fort Frances	International Falls	Minn.	751	Bridge
Lansdowne	Alexandria Bay	N.Y.	753	Bridge
Pigeon River	Grand Portage	Minn.	756	Bridge
Prescott	Ogdensburg	N.Y.	758	Skyway
Rainy River	Baudette	Minn.	759	Bridge

LOCATION of THE INTER-PROVINCIAL BORDER CROSSINGS

Station Location & No.

Hwy	63 Temiscaming	Que./Ont.	884
Hwy	65 E. of New Liskeard	Que./Ont.	885
Hwy	66 E. of Kirkland Lake	Que./Ont.	886

APPENDIX B-1
SAMPLE RATES AND HOURS OF SURVEY

Station Location			Sample	Count	%	Hours
Region 2- Central District						
Toronto East 21	210	Whitby	539	4565	11.8	24
	211	Bowmanville	531	3401	15.6	24
	212	Woodbridge	320	2211	14.5	24
	213	King	429	1488	28.8	23
Toronto West 22	221	Streetsville S	471	3871	12.2	24
	222	Streetsville N	420	4498	9.4	24
	223	Cooksville	136	514	26.3	21
	224	Victoria	182	602	30.1	22
Hamilton 23	230	Winona	329	3397	9.6	24
	231	Oakville	575	4866	11.8	21
	232	Fruitland	346	3262	10.8	24
	233	Fort Erie	480	1074	44.7	24
	234	Bismarck W.B	64	138	46.4	10
		Bismarck E.B	53	104	50.9	10
Region 3- Southwestern						
London 31	311	Putnam N	421	3187	13.2	24
	312	Putnam S	404	2912	13.8	24
Windsor 32	321	Windsor N	287	1884	15.2	24
	322	Windsor S	308	1667	18.5	24
	323	Sarnia N	197	764	25.8	23
	324	Sarnia S	330	570	57.9	24
Region 4- Eastern						
Kingston 41	411	Gananoque N	361	1955	18.5	24
	412	Gananoque S	359	1797	19.9	24
	413	Lancaster N	266	645	41.1	24
	414	Lancaster S	283	1745	16.3	24
	415	Prescott N	231	1712	13.5	24
Ottawa 42	421	Alfred W.B	82	201	40.8	24
		Alfred E.B	68	162	42.0	24
	422	Glen Tay E.B	177	447	39.6	24
		Glen Tay W.B	148	463	31.2	24
	423	Pembroke	115	1192	9.6	16
	424	Casselman	217	427	50.6	24

APPENDIX B-2

Station Location			Sample	Count	%	Hours
Region 5- Northern						
District						
North Bay	511	North Bay S.	223	534	41.8	24
51	512	North Bay W	195	302	64.2	24
	514	Gravenhurst	202	546	37.0	24
	516	Huntsville E.B	62	112	55.4	24
		Huntsville W.B	62	156	39.7	24
N Timmins	521	Cochrane E.B	102	222	45.9	24
52		Cochrane W.B	119	242	49.2	24
	522	Hearst E.B	99	217	45.6	24
		Hearst W.B	87	199	43.7	24
	523	New Liskeard W.B	79	234	33.8	24
		New Liskeard E.B	99	217	45.6	24
S.Ste Marie	531	S. Ste. Marie W.B	129	206	62.6	24
53		S. Ste. Marie E.B	121	169	71.6	24
	532	Spragge E.B	99	312	31.4	24
		Spragge W.B	108	323	33.4	24
Region 6- Northwestern						
Thunder Bay	612	Thunder Bay W.B	74	299	24.8	24
61		Thunder Bay E.B	89	337	26.4	24
	613	Red Rock E.B	115	373	30.8	24
		Nipigon W.B	149	417	35.7	24
Kenora	621	Dryden W.B	70	285	24.6	24
		Dryden E.B	58	329	17.6	24
62	622	Vermillion Bay W.B	134	306	43.8	24
		Vermillion Bay E.B	150	285	52.6	24
	623	Keewatin W.B	100	260	38.5	24
		Keewatin E.B	118	301	39.2	24
	624	Crozier W.B	45	112	40.2	24
		Crozier E.B	63	120	52.5	24

APPENDIX B-3

SAMPLE SURVEYED AT THE INTERNATIONAL BORDER CROSSINGS

Station Location & No.	Sample	Count	%	Hours
746 Cornwall	69	223	31.0	16
758 Prescott	20	26	76.9	24
753 Lansdowne	202	664	30.4	24
744 Queenston	315	698	45.1	24
747 S.Ste Marie	86	170	51.6	24
756 Pigeon River	81	156	51.9	24
751 Fort Frances	42	121	34.7	24
759 Rainy River	7	11	63.6	24

SAMPLE SURVEYED AT THE INTER-PROVINCIAL BORDER CROSSINGS

Station Location & No.	Sample	Count	%	Hours
884 Temiscaming Hwy 63	36	143	25.2	12
885 New Liskeard Hwy 65	45	276	16.3	12
886 E of Kirkland Lake	23	55	41.8	12

APPENDIX C-1

COMMERCIAL VEHICLE SURVEY QUESTIONNAIRE

CARD	RECORD	STATION	TIME	Y Y M M D D	DOW	DIRECTION	
1	1	.		8 3		4W 1N 2E 3S	1

STATION LOCATION MOBILE: .....

A. VEHICLE

(a) Name: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Plate No: ☐☐☐☐☐☐ 22

(b) Province/State of Registration: ..... ☐☐ 47
(Power Unit)

(c) 1 Straight Truck 2 Truck & Trailer 3 Tractor only
4 Tractor & Trailer 5 Two Trailers – B Train
6 Two Trailers – other 7 Other ..... ☐ 49

(d) 1 Van (no temp. cont.) 2 Temp. Controlled 3 Concrete Mixer
4 Stake 5 Dump 6 Tanker
7 Flat Bed 8 Car Carrier 9 Float
0 Other ..... ☐ 50

(e) Number of Axles: ..... ☐☐ 51
Bubble: 1 Yes 2 No ☐ 53
Air Deflector: 1 Yes 2 No ☐ 54

(f) Fuel: 1 Gas 2 Diesel 3 Propane 4 Other ..... ☐ 55

(g) Registered Gross Vehicle Weight: ..... ☐☐☐☐☐☐ 56
Units: 1 kg 2 lbs. 3 Other ..... ☐ 62

(h) Tare (empty) Weight: ..... ☐☐☐☐☐☐ 63
Units: 1 kg 2 lbs. 3 Other ..... ☐ 69

(i) Is the truck leased? 1 Yes 2 No 3 Don't know ☐ 70
Duration. ☐ Units: 1 Days 2 Weeks 3 Months 4 Years ☐☐☐ 71

B. CARRIER

(a) Carrier's operating licence number: ..... ☐☐☐☐☐☐☐ 74

RECORD 2 ☐☐☐☐☐ 1

(b) Type: 1 PCV For-Hire 2 For-Hire but PCV Exempt
3 Intercorporate 4 Private ..... ☐ 7

Intercorporate certificate number .... ☐☐☐ 8

1 CAVR 2 Ten-day Permit 3 Reciprocity (USA)
4 Ontario plate (HTA) 5 Other ..... ☐ 11

(c) Vehicle's Base City and Province or State: ..... ☐☐☐☐☐ 12

(d) Driver Employment: 1 Broker 2 Company Driver 3 Self
4 Driver Agency 5 Don't Know ☐ 17

If driver Agency: duration of work for this shipper:
Units: 1 Days 2 Weeks 3 Months
4 Years 5 Don't Know ☐☐☐ 18

APPENDIX C-2

(e) Carrier Classification (this trip): COL

1 General Freight (LTL)	10 Dimensional Goods (oversize)
2 General Freight (TL)	11 Parcel Carriers/Couriers
3 General Freight Local	12 Lumber & Wood Products
4 Used Household Goods	13 Agricultural Produce (not bulk)
5 Live Animals	14 Air Freight
6 New and Used Auto	15 Primary Metal Products
7 Liquid Bulk Tank	16 Scrap Metal & Garbage
8 Dry Bulk Tank	17 Containers
9 Dump (Aggr., Ore, Coal)	18 Other ..... [ ][ ] 21

C. TRIP DETAILS

(a) Lead Cargo Unit [ ][ ][ ][ ][ ][ ][ ] 23

TRIP	NEAREST CITY	PROVINCE/STATE	
ORIGIN			[ ][ ][ ][ ][ ][ ] PTZ 30
			[ ][ ][ ][ ][ ][ ][ ] 36
DESTINATION			[ ][ ][ ][ ][ ][ ] PTZ 43

(b) Establishment at:

Origin			Destination
Air	1		1 Air
Rail	2		2 Rail
Marine	3	Terminal	3 Marine
Truck	4		4 Truck
Primary Source	5		5 Point of Sale/Consumption
Manufacturer	6		6 Manufacturer
Warehouse	7		7 Warehouse
Distribution Centre	8		8 Distribution Centre
Other.....	9		9 Other.....
Don't Know	0		0 Don't Know [ ][ ] 49

(c) Run Type (this trip):

1 Peddle Run	2 TL	3 LTL
4 Shuttle	5 Local (cartage)	6 Other..... [ ] 51

(d) Seasonal? 1 Yes 2 No 3 Don't Know [ ] 52

D. LOAD

(a) Volume utilization (space):

0 Empty	1 Quarter Full	2 Half Full
3 ¾ Full	4 Fully Full	5 Don't Know [ ] 53

(b) Major Commodity..... [ ][ ][ ] 54

1 On Waybill & Copied	2 Gravel	3 Logs
4 Other.....		[ ] 57

(c) Commodity Weight in kg:..... [ ][ ][ ][ ][ ][ ] 58

(d) Shipper: Name:.....

Location:..... [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ] 64

RECORD [3][ ][ ][ ][ ][ ] 1

(e) Consignee: Name:.....

Location:..... [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ] 7

(f) Dangerous Goods: 1 Documents Copied
2 No 3 Yes 4 Don't Know [ ] 19

If yes, specify..... [ ] 20

Placard Displayed 1 Yes 2 No [ ] 21

APPENDIX C-3

WEIGH SCALE

COL

TIME: ☐☐☐☐

LICENCE PLATE NUMBER: ☐☐☐☐☐☐

AXLE WEIGHTS IN THOUSANDS OF KILOGRAMS:

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ 22

TOTAL WEIGHT: ☐☐☐☐☐☐ 52
FACTOR: ☐☐☐☐☐ 58
NO. OF WAYBILLS: ☐☐ 63
AADT FACTOR: ☐☐☐ 65
DISTANCE: ☐☐☐☐☐ 68
ELECTRONIC TRANSMISSION OF WAYBILLS: ☐ 73

APPENDIX D
GLOSSARY OF TERMS

Bridge Movement

See in-transit movement

Body Type

Otherwise referred to as body style.

Broker

An Owner-Operator is another term used for a broker. He owns the truck and operates it himself, usually under contract with a carrier.

Cartage(Local)

Hauling goods between locations in the same town, city or suburb.

C A V R (Canadian Agreement on Vehicle Registration)

A private or a for-hire carrier registered in a province outside Ontario are allowed to operate in Ontario with a CAVR cab card, which must be kept inside the vehicle.

Under the CAVR agreement with the other Provinces some vehicles are exempt from requiring an Ontario Cab card, these are known as Category "B" vehicles (as opposed to Category A vehicles which require an Ontario Cab card):-

- Category " A "
  1. Scheduled buses
  2. Vehicles having three or more axles. Except those defined as category B vehicles.
- Category "B"
  1. RGVW less than 5500 kg
  2. Charter buses
  3. Farm plated vehicles
  4. Government of Canada vehicles
  5. Used household goods carriers
  6. Transportation of materials used in cultural exhibitions
  7. Recreational vehicles
  8. Farm vehicles carrying owners produce

Combination Truck

Truck or tractor drawing one or more trailers.

Distribution Centre

A place of temporary storage serving an area of high activity such as a wholesale depot for building materials, oil tank installations, steel centres, etc. Generally confined to one category of goods.

Extra-provincial Movement

Trips with one or both trip ends outside the Province of Ontario.

Flatbed

Truck or trailer without sides and top, otherwise called a flatbottom truck.

H.T.A.

The Highway Traffic Act of Ontario.

Float

Semi-trailer with a low slung flatbed.

In-transit

The movements originating from and destined to another Province or State over land routes through Ontario.

In-transit(Canada)

The movements originating from and destined to another Province over land routes through Ontario is referred to as an overland movement, in-transit movement or bridge movement.

In-transit(U.S.A)

The movements originating from and destined to another State and the interaction between one State and another Province over land routes through Ontario is treated as an in-transit(U.S.A) movement.

Intra-provincial Movement

These are trips with both ends in Ontario.

Inter-provincial/International

This refers to the movements with one trip end in Ontario and the other end in another province or state.

L T L (less than truck load)

A quantity of freight less than that required for the application of truck load rates. L T L rates are higher than T L rates.

T L and L T L refers to the rate structure and not to being fully or partially loaded.

Mean (statistical term)

The mean is the most common measure of central tendency for variables measured at the interval level. In short it is the sum of the individual values for each case divided by the number of cases.

Median (statistical term)

The median is the numerical value of the middle case or the case lying exactly on the 50th percentile, once all the cases have been ranked ordered from the lowest to the highest.

Mode (statistical term)

It is the value of a variable which occurs most often.

Operating Licence

A public commercial vehicle operating licence issued under the Public Commercial Vehicle Act.

Overland Movement

See in-transit movement

Peddle Run

Starting and finishing at the same base a truck makes several deliveries and/or collections during the trip.

Point of Sale/Consumption

Retail outlet.

Primary Source

A location at which a commodity is first produced, mined or harvested(e.g gravel pit, mine, quarry, farm, logging camp,etc.)

R.G.V.W

Registered Gross Vehicle Weight

Reciprocity

U.S. vechicles from Reciprocal States do not require Ontario registration. A map of U.S. showing the States with which Ontario has reciprocal arrangements is attached as Appendix L.

Shuttle Run

Going back and forth several times between the same origin and destination. (e.g) a gravel pit operation.

Stake Truck

Truck or trailer body with readily removable stakes.

Tare Weight

Weight of truck when empty.

Ten-day Permit

The permit authorizes the operation of the vehicle in Ontario for a period of not longer than ten days. A temporary registration may be purchased for a motor vehicle or trailer, owned or leased by a resident of Canada or the United States of America. No vehicle plates are issued, however the registrant receives a paper windshield placard. Corridor movements through Ontario are permitted under the permit.

T L (truck load)

This means that the quantity of freight within a consignment is large enough to qualify for a shipment at truckload rates.

Warehouse

Place of storage of goods. There could be more than one commodity stored. It is more a transfer point.

Waybill

Description of goods sent with a carrier.

APPENDIX E

LIST OF COMMODITIES AND COMMODITY GROUPS

(Based on Statistics Canada Version of the Standard Commodity Classification)

SCC 2-DIGIT CODE	
	Group I - Food, Feed, Beverages and Tobacco
01	Meat and Meat Products
03	Fish
04	Other Marine Products
05	Dairy Products, Eggs and Honey
06	Cereal Grains, (including Seed, Flour, Meal and Cereal Preparations)
07	Fruits and Fruit Preparations
08	Nuts (except Oil Nuts)
09	Vegetable Preparations
10	Sugar and Sugar Preparations
11	Cocoa, Coffee, Tea and Spices
12	Margarine, Shortening and Lard
14	Other Foods, Food Materials and Food Preparations
15	Fodder and Feed (except Unmilled Cereal)
17	Beverages
18	Tobacco
19	Live Animals
	Group II - Crude Materials, Inedible
20	Crude Animal Products, Inedible (except Fibres)
21	Crude Vegetable Products, Inedible (except Tobacco, Fibres and Wood)
23	Crude Wood Materials
24	Textile and Related Fibres (including Waste)
25	Metal Ores, Metal in Ores, Concentrates and Scrap
26	Coal, Crude Petroleum and Related Crude Products
27	Crude Non-metallic Minerals (except Coal and Petroleum)
29	Other Waste and Scrap Materials
	Group III - Fabricated Materials, Inedible
30	Leather
31	Furs, Dressed

APPENDIX E(Continued)

LIST OF COMMODITIES AND COMMODITY GROUPS

32	Rubber and Plastic Fabricated Materials
33	Wood Fabricated Materials
34	Pulp
35	Paper and Paperboard
36-38	Textile Fabricated Materials
39	Oils, Fats, Waxes, Extracts and Derivatives, Animal and Vegetable
40-42	Chemicals and Related Products
43	Petroleum and Coal Products
44	Iron, Steel and Alloys
45	Non-ferrous Metals
46	Metal Fabricated Basic Products
47	Non-Metallic Mineral Basic Products
49	Miscellaneous Fabricated Materials

Group IV - End-Products, Inedible

50	Machinery Not elsewhere Specified Classified by Function
51	Conveying, Elevating and Material Handling Equipment
52	Special Industry Machinery
54	Agricultural Machinery and Equipment (except Tractors)
57	Railway Rolling Stock
59	Ships and Boats
60	Aircraft
62	Rubber Tires and Tubes
63	Communication and Related Equipment
65	Heating, Air Conditioning and Refrigeration Equipment
66	Cooking Equipment for Food
67	Plumbing Equipment and Fittings (except Valves, Pipes and Fittings)
68	Electrical Lighting, Distribution and Control Equipment
69	Other Electric Equipment and Appliances
70	Measuring, Controlling, Laboratory, Medical and Optical Instruments, Apparatus and Accessories
71	X-Ray and Related Equipment
72	Safety and Sanitation Equipment, Alarm and Signal Systems

APPENDIX E(Continued)

LIST OF COMMODITIES AND COMMODITY GROUPS

73	Service Industry Service Industry Equipment (including Vending Machines)
74	Furniture and Fixtures
75	Hand Tools and Cutlery (except Table and Kitchen)
76	Other Equipment
77	Office Machines and Equipment
78	Apparel and Accessories
79	Footwear
80	Toiletries, Cleaning Preparations and Chemical Specialties
81	Jewellery and Silverware (except Watches and Clocks)
82	Watches and Clocks
83	Other Recreation Equipment, Toys, Games, Sporting and Athletic Goods
84	House Furnishings
85	Kitchen Utensils, Cutlery and Tableware (except Silverware)
86	Other Household and Personal Equipment
87	Medicinal and Pharmaceutical Products
88	Medical Supplies, Ophthalmic Goods and Orthopaedic Appliances
89	Printed Matter
90	Stationers' and Office Supplies and Artists' Materials
91	Photographic Goods
92	Musical Instruments
93	Firearms, Weapons and Ammunition
96	Remaining End-Products Classified by Material

Group V - Motor Vehicles and Parts

55	Tractors
58	Road Motor Vehicles
61	Miscellaneous Vehicles
95	Containers and Closures

Group VI - Miscellaneous End-Products

94	Miscellaneous End-Products
99	Miscellaneous Products

APPENDIX F

Group 1 -- Food, Feed, Beverages & Tobacco

COUNT / ROW PCT / COL PCT / TOT PCT	WESTERN 1.	ONTARIO 2.	QUEBEC 3.	ATLANTIC 4.	U S A 5.	ROW TOTAL
WESTERN 1.	0 0.0 0.0 0.0	1878 67.3 2.7 2.1	816 29.2 10.5 0.9	33 1.2 7.3 0.0	64 2.3 0.7 0.1	2790 3.1
ONTARIO 2.	2324 3.1 97.8 2.6	59146 78.7 84.3 66.2	6231 8.3 80.1 7.0	412 0.5 92.7 0.5	7036 9.4 82.6 7.9	75148 84.1
QUEBEC 3.	27 0.9 1.1 0.0	2978 94.1 4.2 3.3	79 2.5 1.0 0.1	0 0.0 0.0 0.0	82 2.6 1.0 0.1	3165 3.5
ATLANTIC 4.	24 3.6 1.0 0.0	627 93.4 0.9 0.7	0 0.0 0.0 0.0	0 0.0 0.0 0.0	20 3.0 0.2 0.0	671 0.8
U S A 5.	0 0.0 0.0 0.0	5574 73.9 7.9 6.2	654 8.7 8.4 0.7	0 0.0 0.0 0.0	1312 17.4 15.4 1.5	7540 8.4
COLUMN TOTAL	2375 2.7	70203 78.6	7779 8.7	445 0.5	8513 9.5	89314 100.0

Group II -- Crude Materials, Inedible

COUNT / ROW PCT / COL PCT / TOT PCT	WESTERN 1.	ONTARIO 2.	QUEBEC 3.	U S A 5.	ROW TOTAL
WESTERN 1.	0 0.0 0.0 0.0	352 81.8 0.5 0.5	62 14.5 1.5 0.1	16 3.7 0.3 0.0	431 0.6
ONTARIO 2.	265 0.4 100.0 0.3	60633 87.1 89.9 77.9	3521 5.1 84.3 4.5	5199 7.5 86.3 6.7	69618 89.4
QUEBEC 3.	0 0.0 0.0 0.0	1061 51.8 1.6 1.4	295 14.4 7.1 0.4	693 33.8 11.5 0.9	2049 2.6
ATLANTIC 4.	0 0.0 0.0 0.0	13 100.0 0.0 0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	13 0.0
U S A 5.	0 0.0 0.0 0.0	5350 92.8 7.9 6.9	296 5.1 7.1 0.4	116 2.0 1.9 0.1	5763 7.4
COLUMN TOTAL	265 0.3	67410 86.6	4175 5.4	6024 7.7	77874 100.0

APPENDIX G

Group III -- Fabricated Materials, Inedible

ORIGPROV	COUNT / ROW PCT / COL PCT / TOT PCT	WESTERN 0.	ONTARIO 1.	QUEBEC 2.	ATLANTIC 3.	U S A 4.	U S A 5.	ROW TOTAL
	0.	3	0	596	0	0	0	599
		0.6	0.0	99.4	0.0	0.0	0.0	0.3
		0.6	0.0	0.5	0.0	0.0	0.0	
		0.0	0.0	0.3	0.0	0.0	0.0	
WESTERN	1.	0	0	3001	92	0	100	3192
		0.0	0.0	94.0	2.9	0.0	3.1	1.8
		0.0	0.0	2.6	0.6	0.0	0.3	
		0.0	0.0	1.7	0.1	0.0	0.1	
ONTARIO	2.	54	3882	92556	14152	496	28506	139647
		0.0	2.8	66.3	10.1	0.4	20.4	80.8
		9.6	91.7	78.8	88.9	94.0	83.6	
		0.0	2.2	53.6	8.2	0.3	16.5	
QUEBEC	3.	511	64	10865	505	0	3399	14544
		3.5	0.4	69.2	3.5	0.0	23.4	8.4
		89.9	1.5	8.6	3.2	0.0	10.0	
		0.3	0.0	5.8	0.3	0.0	2.0	
ATLANTIC	4.	0	25	367	0	32	0	424
		0.0	5.9	86.6	0.0	7.5	0.0	0.2
		0.0	0.6	0.3	0.0	6.0	0.0	
		0.0	0.0	0.2	0.0	0.0	0.0	
U S A	5.	0	262	10806	1172	0	2098	14338
		0.0	1.8	75.4	8.2	0.0	14.6	8.3
		0.0	6.2	9.2	7.4	0.0	6.2	
		0.0	0.2	6.3	0.7	0.0	1.2	
	COLUMN TOTAL	568	4233	117391	15921	527	34103	172743
		0.3	2.5	68.0	9.2	0.3	19.7	100.0

Group IV -- End Products, Inedible

ORIGPROV	COUNT / ROW PCT / COL PCT / TOT PCT	WESTERN 0.	ONTARIO 1.	QUEBEC 2.	ATLANTIC 3.	U S A 4.	U S A 5.	ROW TOTAL
	0.	14	0	0	0	0	0	14
		100.0	0.0	0.0	0.0	0.0	0.0	0.0
		85.6	0.0	0.0	0.0	0.0	0.0	
		0.0	0.0	0.0	0.0	0.0	0.0	
WESTERN	1.	0	0	891	147	74	25	1047
		0.0	0.0	76.5	14.0	7.1	2.4	3.7
		0.0	0.0	3.7	6.3	17.1	0.9	
		0.0	0.0	2.0	0.5	0.3	0.1	
ONTARIO	2.	0	1293	16600	1732	359	2190	22239
		0.0	5.8	74.8	7.8	1.6	9.9	77.4
		0.0	88.1	76.5	74.4	82.9	80.5	
		0.0	4.5	57.9	6.0	1.3	7.7	
QUEBEC	3.	0	127	1067	34	0	237	2266
		0.0	5.6	82.4	1.5	0.0	10.5	7.9
		0.0	8.7	8.6	1.5	0.0	8.7	
		0.0	0.4	6.5	0.1	0.0	0.0	
ATLANTIC	4.	0	31	159	0	0	14	204
		0.0	15.2	77.8	0.0	0.0	7.0	0.7
		0.0	2.1	0.7	0.0	0.0	0.5	
		0.0	0.1	0.6	0.0	0.0	0.0	
U S A	5.	2	16	2274	415	0	255	2962
		0.1	0.5	76.8	14.0	0.0	8.6	10.3
		14.4	1.1	10.5	17.8	0.0	9.3	
		0.0	0.1	7.9	1.4	0.0	0.9	
	COLUMN TOTAL	16	1467	21709	2328	433	2729	28683
		0.1	5.1	75.7	8.1	1.5	9.5	100.0

APPENDIX H

Group V -- Motor Vehicles and Parts

ORIGPROV	COUNT / ROW PCT / COL PCT / TOT PCT	1. WESTERN	2. ONTARIO	3. QUEBEC	4. ATLANTIC	5. U S A	ROW TOTAL
WESTERN	1.	0	456	42	0	0	498
		0.0	91.6	8.4	0.0	0.0	1.0
		0.0	1.3	1.7	0.0	0.0	
		0.0	0.9	0.1	0.0	0.0	
ONTARIO	2.	453	29273	2238	76	9533	41573
		1.1	70.4	5.4	0.2	22.9	84.2
		98.5	84.5	90.6	100.0	81.1	
		0.9	59.3	4.5	0.2	19.3	
QUEBEC	3.	7	878	0	0	15	900
		0.7	97.6	0.0	0.0	1.6	1.8
		1.5	2.5	0.0	0.0	0.1	
		0.0	1.8	0.0	0.0	0.0	
ATLANTIC	4.	0	75	0	0	0	75
		0.0	100.0	0.0	0.0	0.0	0.2
		0.0	0.2	0.0	0.0	0.0	
		0.0	0.2	0.0	0.0	0.0	
U S A	5.	0	3946	190	0	2209	6345
		0.0	62.2	3.0	0.0	34.8	12.8
		0.0	11.4	7.7	0.0	18.8	
		0.0	8.0	0.4	0.0	4.5	
	COLUMN TOTAL	460	34628	2470	76	11756	49391
		0.9	70.1	5.0	0.2	23.8	100.0

Group VI -- Miscellaneous End - Products

ORIGPROV	COUNT / ROW PCT / COL PCT / TOT PCT	1. WESTERN	2. ONTARIO	3. QUEBEC	4. ATLANTIC	5. U S A	ROW TOTAL
WESTERN	1.	0	1182	252	20	0	1454
		0.0	81.3	17.3	1.4	0.0	4.5
		0.0	4.9	6.1	6.5	0.0	
		0.0	3.7	0.8	0.1	0.0	
ONTARIO	2.	1426	20308	3536	292	1046	26608
		5.4	76.3	13.3	1.1	3.9	83.2
		93.6	83.4	86.1	93.5	63.1	
		4.5	63.5	11.1	0.9	3.3	
QUEBEC	3.	97	1598	17	0	9	1720
		5.6	92.9	1.0	0.0	0.5	5.4
		6.3	6.6	0.4	0.0	0.5	
		0.3	5.0	0.1	0.0	0.0	
ATLANTIC	4.	0	197	0	0	0	197
		0.0	100.0	0.0	0.0	0.0	0.6
		0.0	0.8	0.0	0.0	0.0	
		0.0	0.6	0.0	0.0	0.0	
U S A	5.	0	1077	304	0	602	1983
		0.0	54.3	15.3	0.0	30.4	6.2
		0.0	4.4	7.4	0.0	36.3	
		0.0	3.4	1.0	0.0	1.9	
	COLUMN TOTAL	1523	24362	4109	312	1656	31962
		4.8	76.2	12.9	1.0	5.2	100.0

APPENDIX I-1

SHORT AND LONG TRUCK SPLIT AT THE SURVEY LOCATIONS

Station Location		Short	%	Long	%	Hours
Region 2- Central						
District						
Toronto East	210 Whitby	840	18	3716	82	24
21	211 Bowmanville	460	14	2941	86	24
	212 Woodbridge	883	40	1328	60	24
	213 King	377	25	1121	75	23
Toronto West	221 Streetsville S	842	21	3264	79	24
22	222 Streetsville N	957	21	3526	79	24
	223 Cooksville	307	57	228	43	21
	224 Victoria	241	40	361	60	22
Hamilton	230 Winona	865	25	2532	75	24
23	231 Oakville	1224	26	3526	74	21
	232 Fruitland	837	27	2238	73	24
	233 Fort Erie	134	12	940	88	24
	234 Bismarck	129	53	113	47	10
Region 3- Southwestern						
London	311 Putnam N	423	13	2764	87	24
31	312 Putnam S	439	15	2473	85	24
Windsor	321 Windsor N	205	11	1679	89	24
32	322 Windsor S	241	12	1687	88	24
	323 Sarnia N	95	12	679	88	23
	324 Sarnia S	75	13	485	87	24
Region 4- Eastern						
Kingston	411 Gananoque N	143	7	1812	93	24
41	412 Gananoque S	163	9	1634	91	24
	413 Lancaster N	124	19	521	81	24
	414 Lancaster S	201	11	1553	89	24
	415 Prescott N	169	10	1543	90	24
Ottawa	421 Alfred W	154	42	209	58	24
42	422 Glen Tay E	148	16	762	84	24
	424 Casselman	98	23	329	77	24

APPENDIX I-2

SHORT AND LONG TRUCK SPLIT AT THE SURVEY LOCATIONS

Station Location			Short	%	Long	%	Hours
Region 5- Northern							
strict							
'th Bay	511	North Bay S.	147	28	387	72	24
	512	North Bay W	98	33	203	67	24
	514	Gravenhurst N	144	23	493	77	24
		Gravenhurst S	150	27	399	73	24
	516	Huntsville E	63	58	46	42	24
		Huntsville W	79	51	71	49	24
'immins	521	Cochrane S	52	24	168	76	24
		Cochrane N	47	19	197	81	24
	522	Hearst E	24	11	193	89	24
		Hearst W	17	9	182	91	24
	523	New Liskeard N	58	25	176	75	24
		New Liskeard S	46	21	171	79	24
ste Marie	531	S. Ste. Marie W	49	24	155	76	24
		S. Ste. Marie E	54	32	116	68	24
	532	Spragge E	47	15	272	85	24
		Spragge W	66	20	257	80	24
Region 6- Northwestern							
nder Bay	612	Thunder Bay W	103	34	196	66	24
		Thunder Bay E	101	30	236	70	24
	613	Red Rock	60	16	319	84	24
		Nipigon W	65	16	346	84	24
ora	621	Dryden W	75	25	227	75	24
		Dryden E	102	33	209	67	24
	622	Vermillion Bay W	53	18	241	82	24
		Vermillion Bay E	37	13	255	87	24
	623	Keewatin W	67	26	195	74	24
		Keewatin E	72	24	227	76	24
	624	Crozier W	26	24	81	76	24
		Crozier E	34	28	86	72	24

APPENDIX I-3

SHORT AND LONG TRUCK SPLIT AT THE SURVEY LOCATIONS

INTERNATIONAL BORDER CROSSINGS

Station Location	Short	%	Long	%	Hours
746 Cornwall N/B	25	22	90	78	16
Cornwall S/B	27	23	92	77	24
758 Prescott N/B	3	21	11	79	24
Prescott S/B	1	8	12	92	24
753 Lansdowne N/B	34	10	301	90	24
Lansdowne S/B	23	7	306	93	24
744 Queenston E/B	65	9	653	91	24
Queenston W/B	59	8	680	92	24
747 S.Ste Marie N/B	4	5	73	95	24
S.Ste Marie S/B	5	5	90	95	24
756 Pigeon River N/B	4	5	79	95	24
Pigeon River S/B	4	5	69	95	24
751 Fort Frances N/B	5	9	51	91	24
Fort Frances S/B	7	10	61	90	24
759 Rainy River S/B	1	9	10	91	24

INTER-PROVINCIAL BORDER CROSSINGS

Station Location	Short	%	Long	%	Hours
884 Temiscaming Hwy 63	29	20	114	80	12
885 New Liskeard Hwy 65	36	13	242	87	12
886 E of Kirkland Lake	25	44	32	56	12

APPENDIX J

Class 1 - Explosives

-Pyrotechnic substances, incendiary or smoke producing substance.
-White phosphorous or substances activated by water, phosphide, inflammable liquid or gel.
-Lead azide, mercury fulminate.
-Detonators, propellants, bombs, other military ammunition.

Class 2 - Gases: Compressed, Liquefied, Dissolved under Pressure or Deeply Refrigerated

-Chlorine: used in the pulp and paper industry and in water purification.
-Anhydrous ammonia: used as a fertilizer, in nitric acid production, refrigeration.
-Oxygen: used in hospitals, for the production of steel
-Ethylene oxide: used as a fumigant, petroleum demulsifier, in antifreeze, used in making explosives.
-Acetylene: used in welding.
-Propane: used in household or industrial fuel, in the manufacturing of ethylene, as a refrigerant, aerosol propellant, gas enricher.
-Butane: used in producing synthetic rubbers, a component of high-octane liquid fuels, propellant in aerosols, food additives, household and industrial fuels.
-Aerosols: used in perfumes, insecticides, inhalants, anti-perspirants, paints.
-Argon: used in light bulbs, arc welding.
-Helium: used in luminous signs, weather balloons, welding.
-Carbon dioxide: used in carbonating beverages, fire extinguishers.
-Hydrogen: used in the production of edible oils and margarine, in metal processess, drug manufacturing, in the production of ammnia and methanol.

Class 3 - Flammable and Combustible Liquids

-Gasoline, naphtha
-Cleaning fluids,paints,enamels,lacquers,paint thinners
-Ethyl alcohol
-Acetone: used as a solvent for chemical compounds in paints, varnishes
-Acetal: used as a flavouring additive in cosmetics, perfumes,solvents
-Toluene: used in saccharin, TNT,lacquers, adhesives, aviation,gasoline, medicine, dyes
-Kerosine, diesel fuel

Class 4 - Flammable Solids, Substances Liable to Spontaneous Combustion, Substances that on Contact with Water Emit Flammable Gases.

- -Sulphur, phosphorus, matches
- -Fish meal
- -Aluminum alkyls: used in tyres, hoses, plastics, insulation
- -Calcium carbide
- -Hexamine, mischmetal, lampblack
- -Magnesium alloys
- -Lithium amide: used in the manufacturing of pharmaceuticals
- -Metallic sodium
- -Hay, straw, fibres, oily cotton waste

Class 5 - Oxidizers and Organic Peroxides

- -Sodium nitrate: used in enamel for pottery, as a preservative, fertilizer and dynamite
- -Ammonium nitrate, sodium chlorate, hydrogen peroxide, magnesium chlorate, potassium permanganate, calcium hypochlorite
- -Organic peroxides: some of them can be unstable and have unfamiliar names, used in plastics industry as polymerizing initiators
- -Peracetic acid: used as fungicide, sterilizing agent
- -Chlorobenzoyl Peroxide: used in bleaching flour.

Class 6 - Poisonous and Infectious Substances

- -Pesticides, herbicides, fumigants, dyes
- -White arsenic: used in wood preservatives, paint pigments
- -Lead acetate
- -Aniline: used in dyes, inks, urethane foams
- -Sodium cyanide: used in insecticides, dyes, pigments
- -Tetraethyl lead: antiknock compound
- -Any substance that is suspected of being infectious to humans or to animals e.g. polio virus, rabies virus, etc.

Class 7 - Radioactives

-Low Specific Activity
. uranium dioxide
. uranium hexafluoride
. heavy water
. thorium compounds
-Medical Radionuclides
. molybdenum 99
. iodine 131
. iodine 125
-Industrial
. cobalt 60
. iridium 192
. cesium 137
-Radioactive Wastes
. from nuclear reactors
. from hospitals
. waste residues from nuclear plants

Class 8 - Corrosives

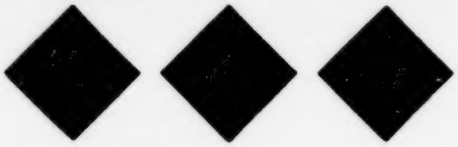
-Caustic soda
-Sulphuric Acid, Nitric Acid, Hydrochloric Acid, Chromic Acid
-Bromine: used in bleaching, water purification
-Potasium Hydroxide: used in soap, liquid fertilizer

Class 9 Miscellaneous Dangerous Substances

-Asbestos: because of the effect of dust on the respiratory system
-Polychlorinated Biphenyls (P.C.B.)

TRANSPORTATION OF DANGEROUS GOODS
IDENTIFICATION PLACARDS

CLASS 1 – EXPLOSIVES



HAZARDS

- –Mass explosion
- –Projection or missile hazard
- –Fire and minor blasts
- –Toxic fumes from a fire
- –14 Explosion effects localized to package
- –15 Insensitive substances having mass explosion hazard

CLASS 2 – COMPRESSED GASES

HAZARDS

- –Asphyxiation
- –Explosion or fire
- –Toxicity
- –Corrosiveness/irritation
- –Container rupture or rocketing
- –Frostbite

CLASS 3 – FLAMMABLE & COMBUSTIBLE LIQUIDS

HAZARDS

- –Fire
- –Toxicity
- –Corrosiveness
- –Explosive vapour

CLASS 4 – FLAMMABLE SOLIDS, SPONTANEOUSLY COMBUSTIBLE, DANGEROUS WHEN WET

HAZARDS

- –Ignites easily
- –Burns violently
- –Spontaneously combustible
- –Toxic/corrosive
- –Water reactive (blue placard)

CLASS 5 – OXIDIZERS & ORGANIC PEROXIDES

HAZARDS

- –Supports burning
- –May ignite
- –Reacts to heat shock friction
- –Reacts to contamination
- –Can be toxic
- –Unstable/explosive

CLASS 6 – POISONOUS & INFECTIOUS SUBSTANCES

HAZARDS

- –Toxic by inhalation absorption or ingestion
- –Water and environmental contamination
- –Harmful to food

CLASS 7 – RADIOACTIVES

HAZARDS

- –Radiation exposure and contamination
- –Fire may melt shielding

CLASS 8 – CORROSIVES

HAZARDS

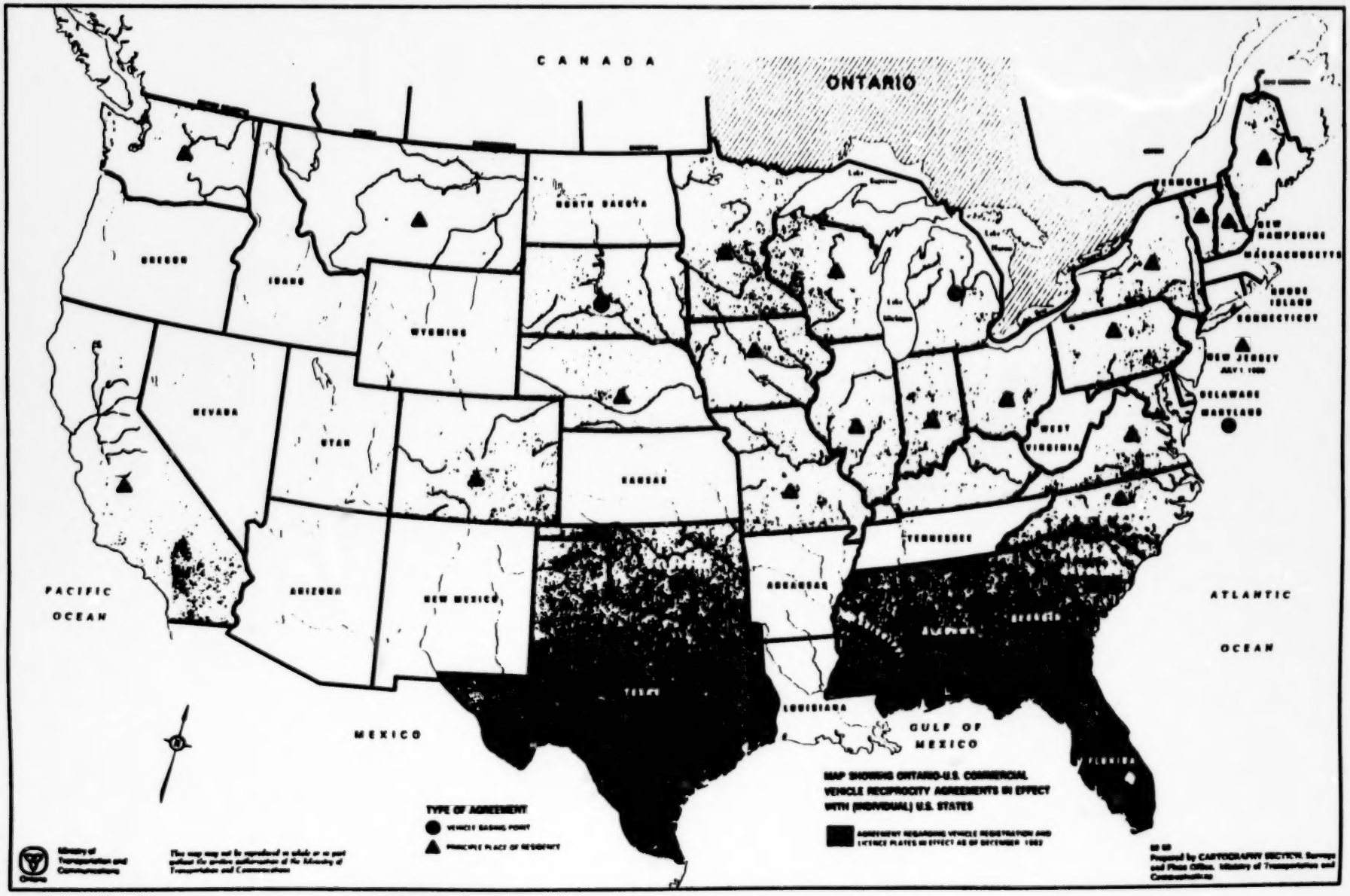
- –Destroys living tissue by contact or inhalation
- –Causes damage to property and environment

CLASS 9 – MISCELLANEOUS DANGEROUS GOODS

- –Miscellaneous dangerous goods
- –Environmentally dangerous goods
- –Hazardous wastes

MULTIPLE RISKS

- –Mixture of classes



APPENDIX L Map Showing Ontario-U.S. Commercial Vehicle Reciprocity Agreements in Effect with U.S. States.

POOR

QUALITY

ORIGINAL